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PROCEEDINGS
OF THE
ENTOMOLOGICAL SOCIETY
OF
WASHINGTON.



Volume VIII, 1906.

(MEETINGS OF NOVEMBER 2, 1905, TO DECEMBER 6, 1906.)

LANCASTER, PA.—WASHINGTON, D. C.
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MARCH-JUNE, 1906.

(Meetings of November 2, 1905, to January 18, 1906.)

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1906

THE ENTOMOLOGICAL SOCIETY OF WASHINGTON.

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The regular meetings of the Society are held on the first Thursday in each month, from October to June, inclusive, at 8 P. M., at the residences of members.

Annual dues of active members, \$3.00; of corresponding members, \$2.00; initiation fee (for active members only), \$1.00. Remittances of dues should be made to the Treasurer.

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PROCEEDINGS
OF THE
ENTOMOLOGICAL SOCIETY
OF WASHINGTON

VOL. VIII. MARCH-JUNE, 1906 Nos. 1-2.

NOVEMBER 2, 1905.

The 199th regular meeting was held at the residence of Dr. Ch. Wardell Stiles, 1412 Hopkins street, N. W., with the president, Mr. Banks, in the chair. The following were present: Messrs. Ashmead, Banks, Barber, Burke, Busck, Caudell, Dyar, Gill, Girault, Heidemann, Hopkins, Knab, Marlatt, Morris, Patten, Quaintance, Schwarz, Scott, Stiles, Titus, Ulke, Webb, and Webster, members, and Messrs. F. W. Goding, E. F. Phillips, and O. W. Barrett, visitors.

Doctor Stiles presented an explanation of the system of card catalogues in use in the laboratories of the U. S. Public Health and Marine Hospital Service, illustrating his remarks with the various types of cards used in the catalogues. Some general discussion regarding the system and also regarding the compilation of a list of all described genera of the world was participated in by members present.

—Doctor Ashmead spoke of a new and remarkable genus of Chalcididæ, parasitic on mantid eggs, that had been recently received from Father Robert Brown, of Manila, P. I. He noted the fact that so many groups that have no spines on the thorax in our country are represented in the tropics by genera provided with spines.

—Mr. Caudell exhibited specimens of the various species of the true katydids (Cyrtophylli) from North America, comprising, in his opinion, three genera and six species. He had examined about 100 specimens and found many striking characters separating the species. In answer to a query regarding the

breeding habits, Mr. Caudell stated that the species, so far as known, live in trees, rarely forsaking the tops and then only, apparently, for the purpose of oviposition. One species has been found ovipositing at night in the bark of a tree near the ground. In one species of this group the female has the power of stridulation—something unknown for this sex in any other group of Orthoptera. Some considerable discussion regarding the ability or non-ability of the insects to fly took place. So far, there is no absolute case known of the insects flying, but some of the members believed that they do fly at times and probably at the mating period.

—Doctor Dyar exhibited the recently issued second volume of Packard's "Monograph of the Bombycine Moths of America North of Mexico," published as a memoir of the National Academy of Sciences. This volume was edited by Samuel Henshaw after Professor Packard's death and treats only of the Ceratocampidæ. A remarkable feature of the plates noted by Doctor Dyar is that all the larvæ are figured upside down. Larvæ in this group always cling to the underside of the twig or leaf upon which they are feeding.

—Doctor Gill made a few remarks on the present erroneous use by several authors of the termination oidea for families. Its well-established application as a termination for super-family groups should preclude the use for any other group.

—Mr. Busck exhibited specimens of a peculiar large anthomyiid fly (*Mydæa pici* Macq.) which is parasitic on small birds in Santo Domingo, W. I. The eggs are laid on the young nestlings and the larva develops in a sac on the head or on the wing of the bird, which, when of small size, is sometimes curiously malformed by the large parasite. The species was described in 1853* from a specimen bred from the wing of a young pigeon in Santo Domingo. The present specimens were bred from a young specimen of the small palm-chat, *Dulus dominicus* L., which was shot on September 8. The larva left the bird the same day, burrowed into earth provided for it in a box, and made a cocoon of particles of earth glued together by a glistening white excretion.

* Ann. Soc. Ent. France, p. 659, Pl. xx, Fig. 11.

The fly issued on September 18. The species is evidently common, the number of small birds affected in that locality amounting to nearly 90 per cent, but the injury is not necessarily fatal and old birds often showed the shriveled up larval sac, indicating infestation in earlier life.

—Mr. Busck spoke also on the presence in Trinidad of the bot-fly that attacks human beings. He stated that many of the coolies are infested with these larvæ.

Mr. Barrett spoke of an experience he had had with this bot-fly while in Mexico, and has since furnished the following abstract of his remarks:

NOTES ON THE MAN-INFESTING BOT IN MEXICO.

By O. W. BARRETT.

[*Author's Abstract.*]

Regarding his experience with the so-called *Dermatobia hominis*, the writer would say that he personally knew of its wide occurrence in the Tuxtla district of Vera Cruz, Mexico, a locality about seventy-five miles southeast of the city of Vera Cruz; it was in the year 1897 when he visited that section and "took the notes."

There are at least three theories for the entrance of the larva beneath the skin. The one that seems most probable is that the newly-hatched grub can crawl some little distance before beginning to burrow. The first symptoms of the attack are intense itching and burning at the mouth of the burrow, which is greatly swollen and reddened. At about the second week of the existence of the larva inside the burrow sharp pains are felt as if nerves were being severed. At the second week, also, begins a slight exudation of serum. Attempts to dislocate the larva by physical means are unavailing on account of the retroverted setæ along the slender caudal portion of the insect. The burrow eventually becomes of some 10 to 20 millimeters in depth, with an opening of 1 to 2 millimeters. The larva is of a dead white color, with dark brown or blackish setæ.

Badly parasitized individuals are likely to suffer from the septic effects of larvæ crushed within the burrows, and of course the pain and worry have a bad psychological effect.

The smothering method of killing the larva is one of the most convenient and successful; fresh "chicle" (*Achras*

sapota gum) or court plaster is used. Cigarette ashes are sometimes worked into the larva sac but tend to increase the irritation and seldom kill the insect.

Mr. Titus mentioned that Mr. R. J. Crew, when collecting in British Guiana, found that he had one of these larvæ in the calf of his leg, but was unable to breed it out on account of the severe pain and probability of blood-poisoning following the attack. He had the larva removed after reaching his home in Canada. Mr. Knab noted that on his recent trip to Central America and Mexico he had seen several cases where the larva was present in human beings. Doctor Stiles stated that this species was known to occur in hogs, dogs, and monkeys on the Isthmus of Panama.

—Dr. F. W. Goding, U. S. Consul at Newcastle, New South Wales, was introduced and spoke several minutes on the entomological conditions in Australasia. He stated, among other things, that the museums in those colonies would be glad to send their specimens to this country and get them worked up.

—Doctor Hopkins then presented the following paper and exhibited specimens and work of several of the species treated:

**BARKBEETLE DEPREDATIONS OF SOME FIFTY YEARS
AGO IN THE PIKES PEAK REGION OF
COLORADO.**

By A. D. HOPKINS, Ph.D.

In the course of my studies of forest insects in different sections of the Rocky Mountain region during the past six years, I have been specially interested in the frequent evidences of wide-spread depredations by barkbeetles, found on old, dead, and fallen timber. During investigations last month (October, 1905) in the Pikes Peak region of Colorado much additional evidence was found on old, dead, standing, and felled trees of the work of the Black Hills beetle (*Dendroctonus ponderosæ* Hopk.) on pine, the spruce-destroying beetle (*D. piceaperda* Hopk.) on Engelmann spruce, and the Douglas spruce *Dendroctonus* (*D. pseudotsugæ* Hopk.) on Douglas spruce, indicating that all of these species have been present and destructive to living timber in this region for from thirty to fifty years. The number and distribution of such old beetle-marked trees indi-

cate that very extensive depredations have been wrought by these barkbeetles in the Pikes Peak region within the past century, and present conditions also indicate that a large per cent of the vast destruction of timber heretofore attributed to fire was primarily due to the work of these insects.

This was particularly striking on the southern slopes of Pikes Peak, at an altitude of about 10,000 feet, where nearly all of the timber had been killed some fifty years ago. In the fragmentary patches of living timber old felled trunks of a primitive matured forest of Engelmann spruce were found thickly covering the ground. On the weatherbeaten surface of these logs the characteristic markings of the galleries of *Dendroctonus piceaperda* were so common as to leave little doubt that the trees had been killed by a destructive invasion of this species—indeed quite conclusive evidence of this is found in the presence of dried resin in the grooves, which would not be found there if the trees had been attacked after they were dying from other causes.

This additional evidence, together with the known devastating work of this class of insects, makes it clear to me that there has been a most intimate interrelation of destructive barkbeetles and forest fires in the denudation of the vast areas of once heavily forested lands in the Rocky Mountain region, and that in very many cases the insects have first killed the timber, and the fire has then followed, leaving the charred trunks and logs as apparent proof that the fire alone was responsible.

DECEMBER 7, 1905.

The 200th regular meeting was held at the residence of Mr. C. L. Marlatt, 1440 Massachusetts avenue, N. W., the president, Mr. Banks, occupying the chair. The following persons were present: Messrs. Ashmead, Banks, Barber, Barrett, Burke, Busck, Casey, Caudell, Couden, Currie, Doolittle, Dyar, Fairchild, Fiske, Gill, Heidemann, Hopkins, Howard, Hunter, Knab, Marlatt, Patten, Piper, Quaintance, Schwarz, Stiles, Titus, Uhler, Webb, and Webster, members, and Messrs. Douglas H. Clemons, E. R. Sasscer, George R. Stetson, and J. F. Strauss, visitors. The minutes of the November meeting were read and approved.

Three persons were elected to active membership, namely, Mr. Jasper M. Lawford, of 718 North Howard street, Balti-

more, Md.; Mr. O. W. Barrett, of the Bureau of Plant Industry, U. S. Dept. of Agriculture; and Dr. E. F. Phillips, of the Bureau of Entomology, U. S. Dept. of Agriculture.

The resignation from membership of Mr. C. L. Pollard was presented and accepted.

By vote of the Society the whole matter of the future publication of the PROCEEDINGS OF THE ENTOMOLOGICAL SOCIETY OF WASHINGTON was referred to the Publication Committee with instructions to report at the next regular meeting of the Society.

The following officers were elected for the year 1906: President, Nathan Banks; First Vice-president, A. D. Hopkins; Second Vice-president, O. Heidemann; Recording Secretary, Rolla P. Currie; Corresponding Secretary, E. S. G. Titus; Treasurer, J. D. Patten; additional members of the Executive Committee: H. G. Dyar, L. O. Howard, and C. L. Marlatt.

—Dr. Howard gave an account of his trip to Europe during the past summer, the object of which was to secure, if possible, for introduction into the United States, the parasitic and predaceous enemies of the gypsy moth (*Porthetria dispar* L.) and brown-tail moth (*Euproctis chrysorrhæa* L.).^a Among the localities visited were the Azores Islands, Gibraltar, Naples, Florence, Milan, Vienna, Budapesth, Dresden, Paris, etc. Many photographs illustrating the trip were exhibited. Among the insects secured as of possible value in destroying the gypsy and brown-tail moths he especially mentioned the fly *Tachina larvarum* L. He also spoke especially of the difficulty of importing the European species of *Calosoma*.

In discussing Dr. Howard's communication Mr. Schwarz reviewed the little which is known of the biology of the *Calosomas* of Europe. It seems pretty well established that there is but one annual generation. He said that too much must not be expected of these beetles as gypsy and brown-tail moth destroyers. Nothing appears to be known of the hiberna-

^a Doctor Howard has published an account of this trip in the Year-book of the U. S. Department of Agriculture for 1905 under the title "The Gypsy and Brown-tail Moths and their European Parasites"; pages 123-138.—PUB. COM.

tion of the species of *Calosoma*, although the probabilities are that the beetles winter as full-grown larvæ in the ground. In his opinion the *Calosomas* of the United States do not have the climbing habit so well developed as do the European species.

Mr. Busck stated that in May, 1898, he packed up a number of living adult specimens of *Calosoma scrutator* Fab., collected at the electric lights at the Capitol, and gave them as a curiosity to Dr. Yngve Sjöstedt who had been visiting in the United States at the time. They were placed in a tin box with a large nest of living half-grown *Hyphantria* larvæ for food and were shipped by express to Dr. Sjöstedt's steamer in New York. In a letter a month later Dr. Sjöstedt wrote that the great majority of the beetles had come over in perfect condition and that he had exhibited them alive at the following meeting of the Stockholm Entomological Society. From this experience it was reasonable to infer that European *Calosomas* could be introduced into the United States.

Mr. Schwarz said that carabid larvæ of various species had been successfully reared on a diet of raw meat by the late Prof. F. G. Schaupp, of Brooklyn, N. Y. Doctor Hopkins stated that he had found *Calosoma* beetles of two species very abundant high up in trees badly defoliated by what was supposed to be canker-worms, in Greenbriar County, W. Va. Mr. Knab said that he had found adults of *Calosoma calidum* Fab. —undoubtedly hibernated individuals—in drift and under stones near Springfield, Mass., in the early spring. Mr. Hunter spoke on the common occurrence of *Calosoma scrutator* Fab. in the Texas cotton fields, where there are no trees near. Mr. Titus said that he had collected *Calosomas* under stones in Colorado, at altitudes of from 6,000 to 8,000 feet, during December and January. Mr. Schwarz spoke on the spread in North America of *Carabus nemoralis* Muell., a European species which is now quite common around Boston. He believed that the introduction of large carabid beetles into the United States is quite feasible. Doctor Howard said that he had met with great conflict of evidence among the European naturalists as to the hibernation of *Calosoma*, and stated that

ever since autumn entomologists all over Europe had been hunting for *Calosoma* to send to America. Up to the present time, however, not a single specimen had been found.

Doctor Hopkins said that this effort to introduce parasites of the gypsy moth and brown-tail moth was a most important one, and he thought it would be well to endeavor to introduce the parasites of other defoliating caterpillars also.

—Mr. Banks then presented the following paper:

NOTES ON *PTERONARCYS*, A GENUS OF *PERLIDÆ*.

By NATHAN BANKS.

The genus *Pteronarcys* comprises the largest of our *Perlidae*. Its members have long attracted attention, since the adult insects retain, in a more or less perfect condition, the gills which served them as organs of respiration during their early stages in the water. A similar condition, however, is now known to exist in various other stone-flies. All but one of the six or seven described species of this genus occur in the United States, the single exception being from Siberia. The best characters for the separation of the species lie in the structure of the ninth ventral segment in the male, and of the eighth ventral segment in the female. Lately I had an opportunity of examining the collection of the late Doctor Hagen in the Museum of Comparative Zoölogy, Cambridge, Mass., and now, in going over my own collection, I find that I have a new species, the most distinct one in the genus. It may be described as follows:

Pteronarcys spinosa, n. sp.

Black, scars of head reddish, a narrow reddish stripe on middle of pronotum, ventral segments of abdomen margined with yellowish.

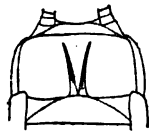


FIG. 1.—*Pteronarcys spinosa*: Eighth ventral plate of female.

Wings not very long; venation dark brown, rather dense; a dark cloud over the first cross-vein between the radial sector and the radius, and extending up into the costal area; another dark cloud near middle of wing and basad of the first one; hind wings with the costal spot, but without the interior one; an elongate black spot near basal costal part of forewings. Female with the 8th ventral segment evenly rounded, and with two long, divaricate, spine-like processes from the middle (fig. 1). Male with the 9th ventral segment broadly truncate at tip, not

covering the 10th, with a scar each side, and a middle area very distinctly separated from the sides by nearly parallel carinæ.

Length to tip of wings, ♂, 34 mm., ♀, 39 mm.

One pair from Oregon, from a Mr. Warren.

To show the position of this species in the genus, I have tabulated our forms for both sexes, as follows:

MALES.

1. Ninth ventral segment elongate, tapering to the notched tip, and covering the 10th segment, its surface minutely transversely striate..4
Ninth ventral segment short, broadly truncate at tip, not covering the 10th; rugose, but not finely striate.....2
2. Middle area of 9th ventral segment with nearly parallel sides.*spinosa*
Middle area of 9th ventral segment much broader at base than at tip ...3
3. The scar or concavity on sides of 9th segment not reaching the base,
californica
The scar extending to base.....*proteus*
4. Notch at tip of 9th segment small.....*nobilis*
Notch at tip deeper and broader.....*regalis* and *pictetii*

FEMALES.

1. Eighth ventral segment without median processes or teeth.....4
Eighth ventral segment with two projections from the middle part..2
2. From middle of 8th ventral segment arise two long, divaricate processes, fully four or five times as long as broad at base.....*spinosa*
Two short teeth, barely longer than broad at base on the posterior margin of the 8th ventral segment.....3
3. The two teeth but little more than their diameter apart....*californica*
The two teeth plainly more than diameter apart.....*pictetii*
4. The 8th ventral segment triangular.....*proteus*
The 8th ventral segment truncate at tip.....*regalis* and *nobilis*

—Mr. Heidemann exhibited specimens of a new species of *Corythuca* and of other species of the genus for comparison, and presented the following paper:

ACCOUNT OF A NEW TINGITID.

By O. HEIDEMANN.

***Corythuca pergandei*, n. sp. (fig. 2).**

Smaller than the oak or sycamore tingitids. The net-like reticulation of the surface yellowish, the areoles more or less translucent; across the elytra are two brown bands, one at base and the other near apex, the latter one sometimes only faintly colored; the membranous pronotal margins also partly infuscated. Body black, except the margin of prosternum, the humeral area, and the last two abdominal segments, which are fulvous; very dark specimens have the abdomen almost entirely black. The pronotal hood, which entirely covers the head, is of moderate size, with the posterior part not very elevated; it is about as long as the triangular portion of pronotum and its posterior globular part is not broader than one of the membranous pronotal margins; it is abruptly constricted at about the middle, from there tapering gradually towards front and forming an apex which, viewed from the side, is

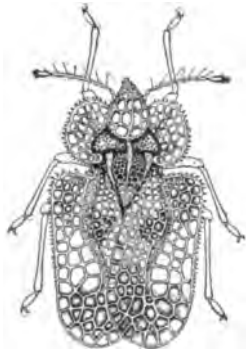


FIG. 2.—*Corythuca pergandei*: Adult.

hook-like. The areoles of the globular portion of the hood are quite large, hexagonal or pentagonal, the others smaller and irregular. Antennæ slender, pilose, and pale yellowish, sparsely beset with a few very long, bristly hairs, the apical joint knobbed at tip, usually darker in color; the third one hardly more than twice the length of the two basal joints taken together; second joint shortest, half as long as the first. The rostrum enclosed in the rostral groove, which is rounded and closed behind, reaches the base of the metasternum. The membranous pronotal margins are bean-shaped and the surface is much sunken before and behind the middle, with the areoles nearly uniform in size.

Pronotal processes broadly triangular, deeply punctured at base and irregularly reticulated towards the apex; the lateral margins only raised anteriorly, having a few cells. Middle carina feebly elevated, hardly one-half as high as the hood, rounding a little from its base and slightly sinuated behind the middle to the tip; it has five or six cells, sometimes one or two additional ones caused by a little cross-vein dividing the middle cell, which is then somewhat embrowned. In some specimens the carina often appears truncated. The elytra when closed are very little longer than broad, rather subquadrate; lateral margins

nearly straight, the anterior and posterior angles broadly rounded; edges of elytra and pronotal margins armed with short, white spines, tipped with black; at the nervures of the hood and near the elevated part of elytra there are also a few scattered spines. Sometimes specimens have the armature a little stronger. Discoidal area irregularly reticulated with four or five rows of areoles, tumidly elevated behind, marked with a brownish spot; the subcostal is biseriate and the costal area has three rows of hexagonal or pentagonal areoles, those on its widest part, mostly at the inner side, very large; on the sutural area before the apex are also a few large hexagonal areoles. Legs yellowish, the tarsi darker at tip. Claspers of the male strongly curved, not hairy.

Length 3.2 mm., width 1.6 mm.

Described from many specimens of both sexes. Some larval forms were also examined. Washington, D. C., February 18, 1884, October 12, 1882 (Pergande), July 18, 1902; Bedford Co., Pa., August 23, 1902; Front Royal, Va., September 10, 1903, May 29, 1904 (Heidemann); Springfield, Mass., August 29, 1902; Urbana, Ill., October 11, 1904 (Knab); Lawrence, Kans. (Tucker).

Type (from Washington, D. C., ♂ and ♀).—No. 8302, U. S. National Museum.

This new species is to be distinguished from *Corythuca ciliata* Say, and from the species occurring on oak by the different shape of the pronotal hood, which is less elevated in both of the latter, and by the fact that in these latter, also, the adjoining middle carina is as high as the globular portion of the hood. It is also distinct from *Corythuca marmorata* Uhler in having the elytra not so much speckled with brownish markings; while *Corythuca incurvata* Uhler differs from it in the great, abrupt height of the hood, and *Corythuca juglandis* Fitch differs from it in the more inflated, globular part of the same.

In one of the note-books of the Bureau of Entomology, Dept. of Agriculture, there is a short account of this tingis by Mr. Th. Pergande under number 2893, as follows:

October 12, 1882, February 18, 1884, found quite a number of Tingis on lower side of leaves of different species of *Alnus* on the Agricultural grounds of Washington, D. C. Mounted winged specimens, marked 2893, and larvæ on slides 3/4/1.5.

No. 2945, November 5, 1882; found several specimens, larvæ and adults of Tingis on lower side of leaves of Hazel. Mounted winged ones, marked 2945, and larvæ on slide 3/1/56.

The U. S. National Museum also contains specimens of this tingis, labeled as found on elm and crab-apple trees. I

have taken specimens from the leaves of black alder as early as May and late in September. The insect hibernates in the adult stage under fallen leaves and in the crevices of the bark.

The eggs of this tingis, which I found on the black alder, are shaped like the eggs of those known to be on oak and are only a trifle larger; this insect has, also, the same habit of depositing its eggs on the underside of the leaves, fastening them to the surface, differing however in that it completely hides them under the dense pubescence of the leaf, in the axil which is formed by the main rib and its side branches. In this way the eggs are entirely out of sight and well protected.

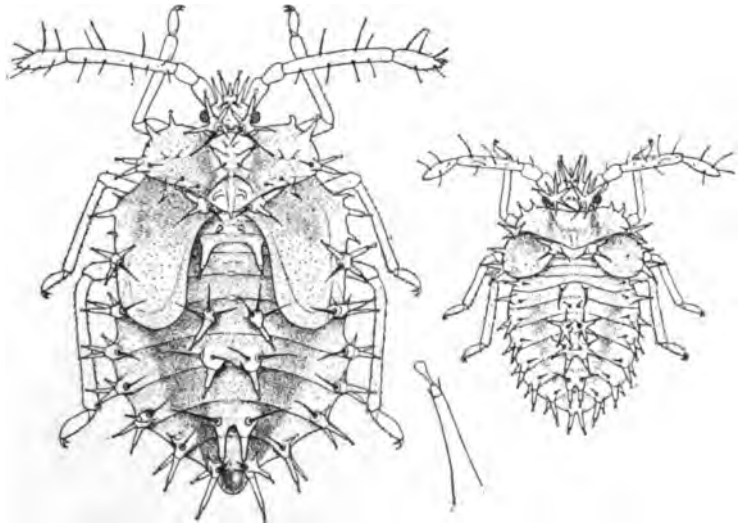


FIG. 3.—*Corythuca pergandei*: Young larva or nymph at right, older nymph at left, enlarged spine between.

The larval forms (fig. 3) are quite similar to those of the oak tingitid, except that the body appears to be less broad. They are armed with the same kind of spines, which Dr. A. W. Morrill in his excellent treatise on the immature stages of some tingitids^a has termed "trumpet-shaped spines, type No. 1, type No. 2, and simple spines, type No. 3." These spines arise from elongated, thick protuberances, or from a conical base, and are situated on the head, at the margins of thorax, and on the dorsal part and sides of the abdominal

^a Psyche, Vol. x, No. 324, pp. 127-134, August, 1903.

segments. But the larvæ of *C. pergandei* show some differences in their last two stages, in having also some spines belonging to type No. 1, rounded at tip (fig. 3), not trumpet-shaped, and more like those of the nymph of *C. ciliata* Say in the first instar, according to Doctor Morrill. Besides there appear in the last stage or pupal form some long, simple spines of type No. 3, which are not pointed at the end, but slightly inflated. Two very long spines of this latter shape rise from the base of the head, and a few smaller ones from the abdominal segments, dorsally, near the margins. The antennæ are sparsely covered with simple spines and the legs with very short ones. I take pleasure in naming this new species in honor of Mr. Theodore Pergande, who was the first to take notice of this species.

—Mr. Barrett showed several photographs taken by Mr. Fairchild and himself, of bumblebees in the act of mating, and presented the following notes:

NOTES ON THE COPULATION OF *BOMBUS FERVIDUS*.

By DAVID FAIRCHILD AND O. W. BARRETT.

(Plate I.)

While walking across the nursery plats of the Arlington Farm, about October 13, the writers noticed three individuals of a species of *Bombus* clinging to a young cherry tree about six inches above the surface of the ground. Upon close examination it was found that one male, apparently lifeless, was *in coitu* with a female of the same color but slightly larger size, and upon the back of the female another male was actively endeavoring to copulate. The female clung tenaciously to the stalk and paid little attention to the maneuvers of the male upon her back. The male *in coitu* was suspended by the genitalia only, all the legs being held appressed to the body and motionless. Upon irritation with a straw the latter male evinced life only by buzzing of the wings. The male not *in coitu*, which may be designated as male No. 2, was quick to notice any interference in his actions by means of the straw but could not be induced to leave the body of the female.

Presumably copulation had continued for some little time previous to the finding of the specimens and there was no apparent tendency towards its cessation when the coitus was

interrupted forcibly, although so gently and gradually that the female was not greatly disturbed. Male No. 1, immediately after connection was broken, evinced a desire to leave the female, showing no desire whatever to renew the relations. Rapidly regaining activity he soon rose in the air and slowly flew away.

Male No. 2 left the back of the female as soon as male No. 1 had disappeared, and stationing himself about fifty or seventy-five millimeters directly in front of her began a series of complex marches and short charges towards her. The female, though loath to move, resisted these advances and when male No. 2 continued to approach her she made a short charge toward him, buzzing her wings and waving the prothoracic legs threateningly. This procedure was repeated several times until the female had succeeded in impressing male No. 2 with the idea that further advances would be dangerous; she even fiercely attacked the male once or twice as the result of his charges toward her. The female next evinced a desire for flight and rose in the air once or twice but was struck back upon the ground. Here she remained, apparently in a sullen mood and scarcely responding to the straw irritations. Male No. 2, noticing the female's change of mood and probably scenting trouble through outside circumstances, gradually lost his interest in the case, though he remained close to the female until the last.

Five photographs were taken, each showing the three insects *in situ*. In No. 1 the female is clinging to a weed stem while male No. 1 is suspended by the genitalia and male No. 2 is clinging to the female.

—Doctor Dyar presented for publication notes on the collections of mosquitoes made for Doctor Howard under the auspices of the Carnegie Institution of Washington by Mr. August Busck in the West Indies and by Mr. Frederick Knab in western Central America. The results of both trips are very satisfactory. Mr. Busck's region proved richer in species, as would be expected, the west coast of Central America being more arid. Many new larvæ were discovered; Doctor Dyar exhibited sketches of 24 species not hitherto known from our territory. Two of them have been previously described by Goeldi from South America; the others are new to us.

The wealth of ædid larvæ shown in these collections had led Dr. Dyar to hope that some character might appear sepa-

rating the aëdid larvæ from the culicids; but such is not the case.*

ILLUSTRATIONS OF MOSQUITO LARVÆ.

By HARRISON G. DYAR, Ph.D.

(Plates II-V.)

***Aëdes busckii* Coq. (Pl. II, fig. 1).**

Head rounded, not angled anywhere, brush concealed; two long spines in front; antennæ short, cylindrical, with single hair near middle. Body hairs moderate, diminishing posteriorly, the short hairs in large stellate bunches. Comb of few scales in a small patch three rows deep with evenly feathered tips. Air tube two and a half times as long as wide, conic, the pecten of six remote long spines with a single hair tuft just beyond the sixth. Anal segment plated, the plate oblique and approaching the brush at the lateral point, spined posteriorly. Tuft normal; side tuft distinct; brush small. Anal gills four, large, white-spotted.

***Aëdes mediovittata* Coq. (Pl. II, fig. 2).**

Head flat behind, rounded on the sides, incised at insertion of antennæ; antennæ slender, cylindric, not exceeding mouth brush, a small hair at middle. Body smooth, all the short hairs developed into contrasting stellate tufts, but the long laterals present also, diminishing a little posteriorly. Air tube one and a half times as long as wide, thick, conic, dark brown; pecten very long and closely set, running in a strongly curved line, followed by a single hair. Comb of seven spines, sole-shaped at base with three-pronged tip. Anal segment half plated, the plate spined at the tip. Dorsal brush large; lateral tuft strong; ventral brush present but without distinct barred area. Anal processes four, short, thick, blunt.

***Aëdes albonotata* Coq. (Pl. V, fig. 23).**

Head rounded, a slight angle at antennæ and posterior margin; antennæ slender, moderate, cylindrical, not very short but weak, with a small single hair, brown. Body hairs diminishing posteriorly, the short hairs rather long and pale, in substellate tufts. Comb of 13 scales in a single curved row, pale, with thick body and feathered tip. Air tube two and a half times as long as wide, the long pecten reaching half way, slightly spirally twisted, followed by a tuft of two hairs. Anal

* See, however, a previously published paper (Proc. Ent. Soc. Wash., Vol. VII, No. 4, pp. 188-191, March 9, 1906), in which it is shown that the Aëdinæ are not separable from the Culicinæ, but that a subfamily may be recognized for the Sabethinæ.—PUB. COM.

segment half plated, oblique, the plate with long spines at the tip. Dorsal tuft, subdorsal one, and ventral brush present. Anal gills four, moderate, about as long as the segment.

Grabhamia scholasticus Theob. (Pl. II, fig. 3).

Antennæ long with tuft at middle, the apical spines with two removed some distance from tip. Air tube inflated, conic, the pecten of four teeth very near the base. Comb of six scales, separate, with rounded bases, the central apical spine longer than the subapical one. Anal segment ringed by the pale plate, the brush preceded by hair tufts to the base. (The anal gills were lost in the specimen and we have not shown them in the figure.)

Grabhamia infine D. & K. (Pl. II, fig. 4).

Head rounded, normal, wider behind, surface sparsely granular; antennæ long, a hair tuft at the middle; labial plate long with radial hairs. Body hairs short, diminishing posteriorly, skin smooth. Comb teeth six, large, subconsolidated, trifid, finely spined. Air tube about three times as long as wide, strongly inflated; pecten of five teeth on basal third, a small tuft before tip. Anal segment short, ringed by the plate, with tufts to the base; brush normal. Anal gills four, slightly tapered, pointed.

Grabhamia pygmæus Theob. (Pl. II, fig. 5).

Head rounded, brown; antennæ short, not exceeding the mouth brush. Thoracic and abdominal hairs of first two segments moderate, the rest slight. Air tube twice as long as wide, short, roundedly inflated; pecten of two teeth near base. Comb of six scales, rounded, with trifid tips, separate. Anal segment weakly chitinized, apparently ringed by the plate; tuft small; brush moderately developed, with tufts along the ventral line to base. Anal gills four, very short, blunt.

Aedes knabi Coq. (Pl. V, fig. 20).

Head rounded, dark; labial plate with long projecting lateral teeth. Snout abdominal hairs stellate. Comb of many scales in a patch, the scale broad with feathered tip. Air tube twice as long as wide, the pecten closely set, running to the middle, followed by a single hair. Anal segment with a large dorsal plate; brush and tuft normal. Anal gills four, short, blunt.

Aedes insolita Coq. (Pl. V, fig. 19).

Head rounded, antennæ small, smooth, a single hair at middle; labial plate sharply triangular with central tooth and small side teeth. Body hairs long, diminishing posteriorly, the short abdominal ones long-stellate, but not conspicuous. Comb a large dense patch of spines, with feathered tips. Air tube and plate blackish; tube two and a half times

as long as wide, conic; pecten reaching half way, rather spiral, long, even, followed by a small hair tuft. Anal segment with a large plate; tuft normal; brush present. Anal gills four, small, blunt.

***Aëdes laternaria* Coq. (Pl. III, fig. 10).**

Antennæ very long and slender, weak. Comb a large patch of scales with widened, feathered tips. Air tube nearly three times as long as wide, conic, the pecten long, sparse, running to half. Anal segment with dorsal plate reaching well down on the sides, incised on the lateral margin. Brush and tuft present, the brush with small tufts preceding. Anal gills four, moderate, the tips rather sharp.

***Culex daumasturus* D. & K. (Pl. II, fig. 6).**

Head rounded, pale; antennæ slender, rather long, suddenly narrowed at terminal fifth with a large tuft at the set-off. Body moderate, the hairs diminishing posteriorly. Air tube about ten times as long as wide, swollen fusiform at outer third, else uniform; pecten very long, but of few teeth; several small scattered tufts. Comb a large patch of simple, thorn-shaped scales over four rows deep. Anal segment ringed by the plate, the brush posteriorly placed, tuft normal. Anal gills four, slender, rather long.

***Culex lamentator* D. & K. (Pl. III, fig. 8).**

Antennæ thick, unusually heavily spinulated with long spinules, the tuft from a set-off at the outer fourth. Body glabrous. Comb of many small spines in a triangular patch. Air tube long, about six times as long as wide, somewhat conical basally, then straight and even; pecten rather long; a double row of hair tufts along posterior edge of tube with a few small tufts scattered elsewhere. Anal segment ringed by the plate, the brush posterior; tuft normal. Anal gills rather long, tapered.

***Culex inhibitor* D. & K. (Pl. III, fig. 7).**

Antennæ thick, the tuft from a set-off at the outer third. Body glabrous; pecten comb of many scales in a triangular patch. Air tube long and even, about six times as long as wide, the pecten on the basal third, followed by a double row of posterior tufts. Anal segment long, ringed by the plate, the brush posterior. Anal gills moderate, pointed.

***Culex mutator* D. & K. (Pl. V, fig. 21).**

Antennæ large, the tuft from a set-off at the outer third. Body pilose. Air tube about four times as long as wide, the pecten of long spines, half as long as the width of tube, few; followed by a double row of tufts. Comb of many spines in a triangular patch. Anal segment ringed by the plate, the brush posterior. Anal gills long.

Mochlostyrax urichii Coq. (Pl. V, fig. 22).

Head rounded, normal, widest behind, neck with a black ring; antennal insertion angled, mouth brush well developed; antennæ moderate, reaching the end of the mouth brush, uniform, a small tuft at middle. Abdominal hairs moderate, rather stout, diminishing posteriorly. Comb of 12 bar-like spines in a single row. Air tube four times as long as wide, tapered most at before tip, pecten of ten long spines evenly spaced; fifteen large hair brushes along the posterior line, four of them within the pecten; no other hairs. Anal segment longer than wide, ringed by the plate; tuft large; a single side hair; brush large and posterior. Anal gills four, rather long, tapered.

Culex bisulcatus Coq. (Pl. IV, fig. 13).

Head large, broad, square, rounded; antennæ long, slender, the tuft at the middle, terminal spines long; labial plate small, the sides nearly perpendicular, central tooth long. Thorax and abdomen with the usual long hairs, not diminishing much posteriorly, all the short ones black thick stellate bunches. Comb a patch of long spines, scarcely over two rows deep, the anterior row straight and overlapping the posterior, more confused row. Air tube eight to ten times as long as wide with long scattered hairs singly or in pairs; pecten to one-third the length, of long sharp spines, rather remote. Anal segment rather long, ringed, with sharp terminal lateral spines. Brush and tuft normal. Anal gills four, moderate.

Culex conservator D. & K. (Pl. IV, fig. 14).

Head rounded, no broader than long; antennæ slender, cylindrical, minutely spined, the terminal sixth narrow with a large tuft at the set-off; terminal spines long. Body hairs normal, rather long, diminishing posteriorly. Air tube long, slender, six times as long as wide, a little enlarged at base; a few scattered single hairs on the posterior side; pecten a short row at base. Comb a large patch of spines over three rows deep, the single spines narrow with fan-shaped tips. Anal segment widened outwardly, ringed by the plate, the brush posterior; a single small lateral hair. Anal gills four, nearly equal, the lower pair being a little smaller.

Aedes cyaneus Fab. (Pl. III, fig. 12).

Head rounded, roundedly angled at the sides, smooth; clypeal hairs single; antennæ straight, moderate, brown, a single hair slightly beyond the middle. Body moderate, the hair long, normal, diminishing posteriorly, the shorter hairs in stellate bunches. Comb a patch of feathered-tipped scales over three rows deep. Air tube short, twice as long as wide, conic, the pecten teeth distant, running to the middle, followed by a single hair tuft; dark brown. Anal segment with dorsal plate, spinose at the end; brush and tuft present, the brush with scattering

hairs preceding it; a tuft at lower angle of plate. Anal pro-gills small, the upper pair about half as long as the segment, the lower pair still shorter. Body dark, blackish pigmented.

***Aedes philosophicus* D. & K. (Pl. III, fig. 11).**

Much like *H. cyaneus*, but the tube more sharply pointed, the comb of few spines in a single row, the single spines sharply thorn-shaped instead of with feathered tips.

***Wyeomyia durhami* Theob. (Pl. III, fig. 9).**

Head rounded, roundedly angled at the corners; antennæ small, cylindrical, without tuft, pale brown. Hairs on the body rather numerous, moderate, not diminishing much posteriorly, still long on the seventh segment. Air tube short, twice as long as wide, sharply conic, strongly tapered on the outer half; no pecten; hair tufts above and below of two to three hairs. Comb of five or six large thorn-shaped spines, well separated, smooth. Anal segment short, with dorsal plate and no ventral brush; two addorsal tufts, a tuft at angle of plate and two small subventral ones. Anal gills four, equal, moderate.

***Wyeomyia grayii* Theob. (Pl. IV, fig. 15).**

Head rounded, arcuate before, posterior angles sharp with a small black arc near the angle; antennæ small, slender, smooth, without tuft. Body moderate, hairs abundant, the long abdominal hairs single and not diminishing posteriorly. Comb a single row of spines nearly to the ventral line, some ten large ones above continued by smaller spines. Air tube long, six times as long as wide, basal half cylindrical, distal half conic; no pecten; several scattered hairs. Anal segment short, with dorsal plate; no ventral brush, the tufts addorsal, lateral and subventral. Anal gills four, equal, normal.

***Wyeomyia ulocoma* Theob. (Pl. IV, fig. 17).**

Head round, angled behind, the eyes small, round; antennæ small, tapered without, with no visible hair. Thorax quadrate, transverse, with a thorn at the posterior angle of metathorax. Long hairs few, short ones in stellate bunches, dark, conspicuous. Air tube five times as long as wide, tapered outwardly; pecten of four spine-like scales preceded by a hair and followed by two; several hairs on the dorsal aspect. Comb a thick band of fan-tipped scales covering most of the side, three rows deep, crowded. Anal segment with dorsal plate spined behind; addorsal and lateral long hairs and subventral small tuft; no ventral brush. Anal gills long, four, equal, rounded, narrow.

***Wyeomyia asullepta* Theob. (Pl. V, fig. 24).**

Head rounded, angled behind, antennæ small, cylindrical, without tuft. Abdominal hairs rather slight, diminishing posteriorly, skin

smooth. Comb of 13 obliquely erect, thorn-shaped scales in a straight row. Air tube three times as long as wide, conic; several two-haired tufts below; no pecten. Anal segment with dorsal plate with heavy chitinous basal band; dorsal tuft, lateral and subventral hairs; no ventral brush. Anal gills with the lower two sac-like, the upper two minute.

Sabethoides undosus Coq. (Pl. IV, fig. 16).

Head rounded, narrowed before, widest at posterior angles, a black bar on back of head just behind angle; antennæ short, not exceeding the mouth brush. Hairs moderate, diminishing posteriorly, the short hairs large stellate tufts very coarse and black. Pecten of six large remote thorn-shaped teeth in a line. Air tube flared at base, then straight and even, very long; a few fine hair tufts especially along the ventral edge; no pecten. Anal segment plated, with dorsal and subdorsal tufts on the plate; two subventral tufts joined by a chitinous band, all of long hairs. Anal gills four, rather long, tapered abruptly on distal half.

Trichoprosopon nivipes Theob. (Pl. IV, fig. 18).

Head rounded, broader than long; eye very small, rounded, black; antennæ very small, scarcely as long as the mouth brush. Body long, equal, the hairs moderate, multiple, diminishing posteriorly; eighth segment without a lateral comb but a single stout seta arising from a large tubercle. Air tube very small, about half as long as the width of the body, straightly tapered, twice as long as wide; no pecten; a stout tuft at middle and slight hairs on dorsal aspect. Anal segment short with a dorsal plate narrowed laterally, squarely terminated; dorsal hairs stout and long; a hair at lateral margin of plate; two subventral tufts joined by a curved chitinous band; no ventral brush. Anal gills four, large and swollen, bluntly rounded, sack-like, rather opaque, spotted.

EXPLANATION OF PLATES.

- Fig. 1. *Aedes busckii* Coq.
 2. *Aedes mediovittata* Coq.
 3. *Grabhamia scholasticus* Theob.
 4. *Grabhamia infine* D. & K.
 5. *Grabhamia pygmaeus* Theob.
 6. *Culex daumasturus* D. & K.
 7. *Culex inhibitor* D. & K.
 8. *Culex lamentator* D. & K.
 9. *Wyeomyia durhami* Theob.
 10. *Aedes laternaria* Coq.
 11. *Aedes philosophicus* D. & K.
 12. *Aedes cyaneus* Fab.

13. *Culex bisulcatus* Coq.
 14. *Culex conservator* D. & K.
 15. *Wyeomyia grayii* Theob.
 16. *Sabethoides undosus* Coq.
 17. *Wyeomyia ulocoma* Theob.
 18. *Trichoprosopon nivipes* Theob.
 19. *Aedes insolita* Coq.
 20. *Aedes knabi* Coq.
 21. *Culex mutator* D. & K.
 22. *Mochlostyrax urichii* Coq.
 23. *Aedes albonotata* Coq.
 24. *Wyeomyia asullepta* Theob.
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The following papers by members of the Society have been accepted by the publication committee:

**CLASSIFICATION OF THE FORAGING AND DRIVER
ANTS, OR FAMILY DORYLIDÆ, WITH A DE-
SCRIPTION OF THE GENUS
CTENOPYGA ASHM.**

By WILLIAM H. ASHMEAD, M.A., D.Sc.

In the Canadian Entomologist for November, 1905, pages 381 to 384, I gave a skeleton of a new arrangement of the families, subfamilies, tribes, and genera of the Ants, or the superfamily Formicoidea in which several new genera were indicated. Among these was the genus *Ctenopyga*, from Mexico, which I now describe and figure, after giving analytical tables for recognizing the three subfamilies, the tribes, and the genera falling in each, according to the three sexes, worker, female, and male, when known, taken from my forthcoming classification of the Ants, or the superfamily Formicoidea.

Family XLIII. DORYLIDÆ.

The ants belonging to this family are held together and easily separated from those of other families by habits and by peculiarities of structure, the females being nearly always wingless, the workers having the antennæ inserted much farther forward on the head, close to the anterior margin, and by the genitalia of the males which differ widely from those of other ants, the terminal ventral plate, or the hypopygium, being broad and deeply semicircularly emarginated, forked or bispined.

It is this character which induces me to place the *Acanthostichinæ* in this family rather than in the family *Poneridæ*, although otherwise, especially in the workers, they are apparently just as closely allied to that family, where Forel and Emery now place them.

The first species discovered, however, was a worker and that was originally placed by Frederick Smith, of the British Museum, in the Dorylid genus *Typhlopone* Westwood. Dr. Gustav Mayr made *Typhlopone serratula* Smith the type of his genus *Acanthostichus*, which is now known in all three sexes, the female having been described and figured recently by Professor Emery, who also at one time classified the genus with the subfamily *Dorylinæ*.

The three subfamilies may be recognized from the structural characters made use of in the following table:

TABLE OF SUBFAMILIES.

1. Workers	2
Females	5
Males	12
2. Abdominal petiole composed of only <i>one</i> joint	4
Abdominal petiole composed of <i>two</i> joints.....	3
3. Antennæ 9 to 10-jointed.....	Subfamily I. ECITONINÆ
4. Antennæ 9 to 12-jointed.	
Pygidium normal, the apical margin not armed with a row of fine teeth.....	Subfamily II. DORYLINÆ
Pygidium abnormal, the apical margin armed with a row of fine teeth.....	Subfamily III. ACANTHOSTICHINÆ
5. Wingless forms.....	6
Winged forms.....	11
6. Head <i>without</i> either eyes or ocelli.....	7
Head with the eyes present, represented by a single ocellus, at or near the lateral middle.....	8
7. Head <i>not</i> distinctly bilobed; thorax with only the pronotal suture present, the mesonotal suture absent...Subfamily I. ECITONINÆ	
Head distinctly bilobed; thorax with the pro- and meso-notal sutures distinct.....	Subfamily II. DORYLINÆ
8. Pygidium normal, unarmed.....	9
Pygidium abnormal, the apical margin armed with a row of minute teeth	10
9. Meso-metanotal suture absent, the meso- and meta-notum closely united, the pronotal suture indistinct...Subfamily I. ECITONINÆ	
Meso-metanotal suture distinct, the meso- and meta-notum separated, the pronotal suture distinct.....	Subfamily II. DORYLINÆ

10. Thorax with only the meta-notal suture present, indicated by a transverse row of punctures; head not bilobed,
Subfamily III. ACANTHOSTICHINÆ
11. Pygidium armed with a row of fine teeth along the apical margin; front wings with *three* cubital cells,
Subfamily III. ACANTHOSTICHINÆ
12. Submedian cell in front wings *shorter* than the median cell, the transverse median nervure uniting with the median vein *before* the basal nervure.....13
Submedian cell in front wings distinctly *longer* than the median cell, the transverse median nervure uniting with the median vein *beyond* the basal nervure
Femora neither flat nor compressed....Subfamily I. ECITONINÆ
Femora abnormally flat or compressed.Subfamily II. DORYLINÆ
13. Femora abnormally flat or compressed; mandibles more or less sickle-shaped or conical, without teeth or a masticatory edge,
Subfamily II. DORYLINÆ
Femora normal, neither flat nor compressed; mandibles more or less triangular, and with a broad masticatory edge,
Subfamily III. ACANTHOSTICHINÆ

Subfamily I. ECITONINÆ.

1893. 2me Tribu: Ecitonii Forel, Ann. Soc. ent. Belgique, xxx, p. 163.
1895. 2 Tribus: Ecitonii Emery, Zool. Jahrb. Syst., viii, p. 765.

This subfamily I have divided into two minor groups or tribes, as follows:

TABLE OF TRIBES.

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1. Workers | 2 |
| Females | 3 |
| Males | 4 |
| 2. Mesonotal suture wanting or never distinctly defined. | |
| Antennæ 12-jointed; inner tibial spur pectinate. | Tribes I. Ecitonini |
| Antennæ 10 or 11-jointed; inner tibial spur apparently simple, | Tribes II. Ænictini |
| 3. Wingless; head not distinctly bilobed. | |
| Eyes represented by a single ocellus a little <i>behind</i> the lateral middle of the head; node of petiole transverse, concave medially and posteriorly, the upper hind angles prominent; antennæ 12-jointed, | Tribes I. Ecitonini |
| Eyes absent or represented by a single ocellus <i>before</i> the lateral middle of the head; node of petiole a little longer than wide; antennæ 10-jointed, or rarely 11-jointed..... | Tribes II. Ænictini |
| 4. Front wings with <i>three</i> cubital cells..... | Tribes I. Ecitonini |
| Front wings with <i>two</i> cubital cells..... | Tribes II. Ænictini |

Tribe I. ECITONINI.

This tribe seems to be confined to the New World—North, Central, and South America, and the West Indies.

TABLE OF GENERA.

1. Workers	2
Females	3
Males	4
2. Antennæ 12-jointed; workers more or less dimorphic, the soldiers with long, hook-like mandibles, the workers with triangular mandibles; metathorax bicarinate; maxillary palpi 2-jointed, labial palpi 3-jointed.	
Claws <i>with</i> a tooth beneath	<i>Eciton</i> Latreille
(Type, <i>Formica hamata</i> Latreille)	
Claws <i>without</i> a tooth beneath, simple.....	<i>Acamatus</i> Emery
(Type, <i>Eciton schmitti</i> Emery)	
3. Wingless; meso- and meta-notum divided, together scarcely longer than wide; abdominal petiole transverse, above triangularly concavely emarginate posteriorly.	
Claws <i>with</i> a tooth beneath.....	<i>Eciton</i> Latreille
Claws <i>without</i> a tooth beneath, simple.....	<i>Acamatus</i> Emery
4. Front wings with <i>three</i> cubital cells.	
Abdominal petiole above <i>subconvex</i> or at least never deeply concave; mandibles narrow, falciform, acute at apex.....	5
Abdominal petiole above deeply <i>concave</i> ; mandibles broadened, not falciform	6
5. Subdiscoidal cell <i>not</i> interstitial with the apex of the submedian vein.	
Claws <i>with</i> a tooth beneath.....	<i>Eciton</i> Latreille
Claws <i>without</i> a tooth beneath, simple.....	<i>Acamatus</i> Emery
6. Subdiscoidal nervure interstitial with the apex of the submedian vein; claws with a small tooth beneath..	<i>Mayromyrmex</i> Ashmead
(Type, <i>Labidus fargeai</i> Shuckard)	

Tribe II. ÆNICINI.

This tribe is apparently confined principally to the Asiatic fauna, a few only occurring in Africa.

TABLE OF GENERA.

1. Workers	2
Females	5
Males	6
2. Antennæ 10-jointed.	
Eyes wanting	3
Eyes present	4

3. Ocelli absent; femora clavate; metathorax posteriorly truncate and bounded by an elevated rim at apex; mandibles curved downward; claws simple *Ænictus* Shuckard
(Type, *Æ. ambiguus* Shuckard)
4. Eyes prominent, placed at the lateral middle of the head, the ocelli represented by a single ocellus anteriorly..... *Oöceraa* Roger
(Type, *O. fragosa* Roger)
5. Wingless; head oblong-quadrangular, much wider than the thorax; thorax more than thrice longer than wide, without sutures; abdominal petiole quadrangular, longer than wide; antennæ 10-jointed.
Ænictus Shuckard
6. Front wings with *two* cubital cells, the stigma distinct, the transverse median nervure interstitial with the basal nervure or nearly, the median and submedian cells equal or nearly; pygidium posteriorly rounded; antennæ tapering off at apex, the intermediate joints wider than long *Ænictus* Shuckard

Subfamily II. DORYLINÆ.

This subfamily reaches its greatest development in Africa where the genera and species are numerous, although a few extend into Asia.

It may not occur in America, as the two American genera placed here, namely *Typhlopone* Westwood and *Cheliomyrmex* Mayr are unknown to me in nature and are placed here from the description alone. I suspect that both may belong to the Ecitoninæ. *Sphinctomyrmex* Mayr is also another doubtful Doryline which I have not been able to see.

Two distinct tribes have been recognized from the males.

TABLE OF TRIBES.

Front wings with *three* cubital cells, the second receiving only one recurrent nervure Tribe I. *Ænictogitonini*
Front wings with *two* cubital cells, the first receiving the single recurrent nervure Tribe II. *Dorylini*

Tribe I. *ÆNICTOGITONINI*.

This tribe is based upon the genus *Ænictogiton* Emery, known only in the male sex, the type being *A. fossicans* Emery. The worker and female will probably resemble some of those in the tribe Dorylini.

Tribe II. *DORYLINI*.

Africa is evidently the original home of this tribe, where the genera and species are abundantly represented. Prof. C. Emery, the eminent Italian myrmecologist, in his paper "Die

- Abdominal petiole wider than long, or at the most not longer than wide *Dorylus* Fabricius
(Type, *Vespa helvolus* Linné)
9. Mesonotal suture obsolete or very indistinct.....10
Mesonotal suture very distinct or indicated by a constriction.....13
10. Abdomen normal, not constricted between each segment.....11
Abdomen abnormal, constricted between each segment; pygidium impressed or forked; antennæ 11-jointed (rarely 12-jointed),
Sphinctomyrmex Mayr
(Type, *Typhlopone stoll*i Mayr)
11. Antennæ 11 or 12-jointed.....12
Antennæ 10-jointed.
Head very large, the clypeus prominent.....*Shuckardia* Emery
(Type, *Alaopone abeillei* André)
12. Antennæ 12-jointed, gradually thickened towards apex; head not much longer than wide; maxillary palpi 2-, labial palpi 3-jointed; mandibles curved, with a strong triangular tooth near base within *Cheliomyrmex* Mayr
(Type, *C. Nortoni* Mayr)
Antennæ 12-jointed; head about twice as long as wide,
Probolomyrmex Mayr
(Type, *P. filiformis* Mayr)
13. Antennæ 12-jointed, gradually thickened towards apex; clypeus very narrow, transverse; maxillary palpi 2-, labial palpi 3-jointed,
Cheliomyrmex Mayr
(Type, *C. nortoni* Mayr)
14. Head bilobed; petiole transverse, obtuse above and produced into acute angles behind.
Thorax trilobed15
Thorax *not* trilobed16
15. Thorax trilobed with a distinct constriction between the lobes, the metathoracic lobe the narrowest; mandibles long acute; abdomen terminating in a peculiar plate which has a deep, narrow, median emargination at apical half.....*Anomma* Shuckard
Thorax trilobed but without a distinct constriction between the lobes, although the lobes are distinctly separated or indicated by faint sutures above; hypopygium not narrow, broadly emarginate at apex *Dorylus* Fabricius
16. Thorax a parallelogram, a little more than twice as long as wide, with a slight lateral constriction at the middle, the lobes closely united, not indicated by sutures above; hypopygium narrow, the sides parallel, deeply forked at apex.....*Dichthadia* Gerstäcker
17. Front wings with *two* cubital cells, the stigma narrow, lanceolate. Abdominal petioles wider than long, convex anteriorly, but truncate or emarginate posteriorly; first two joints of flagellum nearly equal18

- Abdominal petiole quadrate or rounded; first two joints of flagellum unequal19
18. Mandibles about *four* times as long as wide at base; submedian cell shorter than the median*Anomma* Shuckard
- Mandibles much broader, at the most only three times as long as wide at base.
- Submedian cell *shorter* than the median.....*Dorylus* Fabricius
- Submedian cell *longer* than the median.....*Rhogmus* Shuckard
19. Mandibles broad, at the most not twice as long as wide at the base, 20
- Mandibles narrow, about *three* times as long as wide at base.
- Thorax with appressed pubescence above....*Typhlopone* Emery?
20. Thorax dorsally *with* an oblique, erect pubescence.
- Mandibles much narrowed towards apex and produced into a long point*Dichthadia* Gerstäcker
- Mandibles not especially narrowed towards apex.*Alaopone* Emery
- Thorax dorsally *without* an erect pubescence, but with only a fine quite appressed pubescence.....*Shuckardia* Emery

Subfamily III. ACANTHOSTICHINÆ.

1893. 2me Tribu: Cerapachysii Forel (partim), Ann. Soc. ent. Belgique, xxxvii, p. 162.
1895. 3 Tribus: Cerapachyi Emery (partim), Zool. Jahrb. Syst., viii, p. 765.
1901. 1 Tribu: Acanthostichii Emery, Bull. Soc. ent. Belgique, xlv, p. 34 (Poneridæ).

This subfamily is undoubtedly closely allied to the next family, or the Poneridæ; but on account of the male genitalia being similar to the dorylid type I prefer to retain it in this group.

Representatives are known in North America, *i. e.* Texas, Mexico, and Central America and in South America. The first specimen I had seen of this curious group, *Acanthostichus kirbyi* Emery, was kindly given to me by my friend, the eminent French hymenopterologist, Mr. Ernest André, of Gray, France. This has aided me very materially in working out the new genus characterized below:

TABLE OF GENERA.

1. Workers2
 Females3
 Males6
2. Mesonotal suture obsolete or very indistinct; head oblong, smooth, the sides nearly parallel; frontal carinæ with lobes that cover the

articulation of the antennæ, the latter 12-jointed; thorax flattened above, with some elongate punctures; abdominal petiole quadrate, with a number of irregular depressions above,

Acanthostichus Mayr

(Type, *Typhlopone serratula* Smith)

- Unknown (see ♀ and ♂).....*Ctenopyga* Ashmead
3. Wingless4
- Winged5
4. Head oblong, not bilobed, *without* ocelli, the eyes minute; thorax with the meso- and meta-notum not divided by a distinct suture, together a little wider than long; abdominal petiole wider than long, trapezoidal, subconvex above.....*Acanthostichus* Mayr
5. Front wings with *three* cubital cells, a distinct stigma, and with the marginal cell more or less open at apex; submedian cell shorter than the median; pygidium with the apical margin armed with a row of spines; head oblong, the eyes and ocelli present; claws simple*Ctenopyga* Ashmead
(Type, *C. townsendi* Ashmead)
6. Marginal cell open at apex; flagellum rather stout, subclavate, the joints after the first a little wider than long; disk of mesonotum posteriorly flattened, the parapsidal furrows not distinct,
Acanthostichus Mayr
- Marginal cell usually closed at apex; flagellum subfiliform, the joints a little longer than wide; disk of mesonotum subconvex, the parapsidal furrows and the humeral furrows present,
Ctenopyga Ashmead

***Ctenopyga townsendi* n. sp. (fig. 4).**

♀.—Length 5 mm. Castaneous, the head piceous-black, smooth and shining, the eyes well developed, oval, faceted, placed slightly beyond the lateral middle, the scape of the antennæ and the legs rufo-testaceous, the flagellum clavate, brownish, becoming yellowish at apex, the club distinctly yellowish. The oblong head is slightly wider than the thorax and about twice as long as wide, the hind margin only slightly and broadly emarginate, ocelli small, arranged in a triangle; the face has a median grooved line anteriorly between the antennæ; the antennal scape is depressed, somewhat broadened, and reaches to the base of the eyes, while the flagellum is clavate, thickened towards apex, the funicle joints being wider than long; the mandibles are large, triangular, with a broad, sharp, but edentate masticatory edge, the edge bordered with a few punctures; the thorax is a little more than four times as long as wide, slightly narrowed posteriorly, the anterior margin rounded, the posterior margin sharply but slightly obliquely truncate, the pro-, meso-, and meta-notal sutures distinct, the mesonotum a little longer than the pronotum, the scutellum well differentiated, with a crenate furrow across the base, the metanotum obtrapezoidal; the mesosternal

suture is distinct. Wings clear hyaline, the stigma brown, the veins pale, the cells as in figure 4. The abdomen is longer than the head and thorax united, cylindrical and very similar to the worker in *Acanthostichus* Mayr, the petiole being longer than thick, with a tubercle beneath at base, the pygidium at apex hairy and armed with a row of comb-like teeth.

♂.—Length about 4 mm. Highly polished black; the mandibles, the scape and pedicel of the antennæ, and the legs, except knees, tips of front tibiæ and all tarsi which are more or less yellowish, rufous or

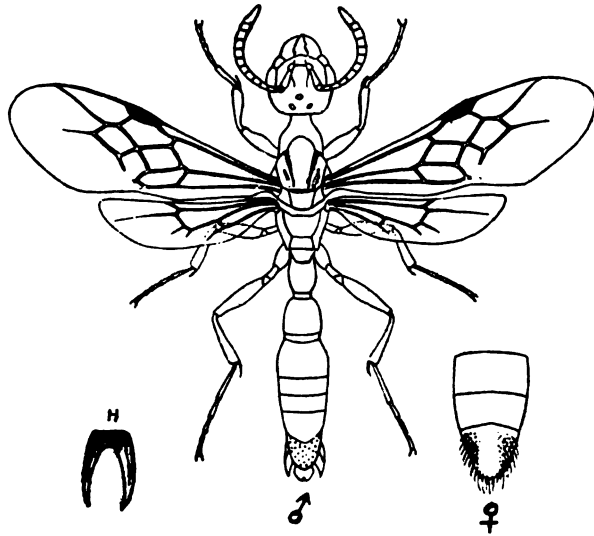


FIG. 4.—*Ctenopyga townsendi*: Male in center, tip of female abdomen at right, male hypopygium (H) at left.

rufo-piceous, the coxæ and femora dark; the flagellum is brownish yellow, subclavate, the last joint conical, a little longer than the two preceding joints united, the joints 1 to 6 longer than thick; wings much as in female. The parapsidal furrows are complete and the lateral lobes have the humeral furrow well developed; the hypopygium (fig. 5), which is strongly forked, and the genitalia are testaceous.

Type.—No. 7818, U. S. National Museum.

La Puerta, Mexico. One female and two male specimens taken May 6, 1895, by Professor C. H. Tyler Townsend.

NEW GENERIC NAMES.

Prof. T. D. A. Cockerell has kindly called my attention to the fact that three genera recently established by me are pre-

occupied in other departments of zoölogy and must be changed. I suggest the following new names:

Eiseniella n. n.

Eisenia Ashmead (not Malm, 1877), Mem. Carnegie Museum, 1, No. 4, p. 232, 1904.

Elasmognathias n. n.

Elasmognathus Ashmead (not Gray, 1867), Proc. U. S. Nat. Mus., xxix, No. 1424, p. 405, 1905.

Orthonotomyrmex n. n.

Orthonotus Ashmead (not Westwood, 1829), Can. Ent. xxxvii, No. 11, p. 384, November, 1905.

A NEW SPECIES OF THE CURCULIONID GENUS PARAPLINTHUS.

By W. F. FISKE.

Paraplinthus shermani n. sp.

Length 6.8 mm.; color very dark brown, more or less tinged with reddish; above sparsely clothed with elongate, yellowish scales, forming obscure irregular markings on the elytra. Prothorax with sides evenly rounded, convex above, median carina narrow, straight, sharply defined; surface above and on both sides with irregular, coarse, shining tubercles; punctures of elytral striæ sometimes separated with slightly elevated tubercles; interspaces each with one row of tubercles, more strongly developed on the alternate interspaces, which are also distinctly elevated.

Type.—No. 6370, U. S. National Museum.

Collected on Pisgah Ridge, Transylvania Co., N. C., at an elevation of between 5,000 and 6,000 feet. Three others were collected by the author at the same time. In the U. S. National Museum there is also a specimen from Grandfather Mountain, N. C., elevation above 4,000 feet, collected by J. M. Bentley, and received through Prof. Franklin Sherman, Jr., after whom the name *shermani* was proposed by Mr. Schwarz.

The species is easily distinguishable from *P. carinatus* Boh. by the sculpture of the prothorax and elytra. In *P. carinatus* the prothorax is depressed above, with coarse confluent punctures which are better defined on the sides. The striae punctures are more prominent and the even interspaces are not tuberculate. The occurrence of *Paraplinthus* in the Appalachian region is rather notable, as the genus has hitherto been

known in North America only from Alaska, and southward on the Pacific slope through British Columbia, Washington, and Oregon, to northern Idaho. According to Mr. Schwarz, its occurrence is paralleled by the distribution of other genera in Coleoptera, for instance, *Necrophilus* and *Pinodytes* of the Silphidæ. The eastern species of *Paraplinthus* was collected on the underside of freshly cut spruce chips lying on the ground.

THE SOUTH AMERICAN COCCIDÆ OF THE GENUS ERIOCOCCUS.

By T. D. A. COCKERELL.

It used to be supposed that *Eriococcus* was absent from South America, but in recent years a few species have been found in Brazil. Hempel cites three, but one of them, *E. armatus* Hempel, is an *Erium*. Mr. Schrottky has sent me a very ordinary-looking species from Villa Encarnacion, Paraguay (his No. 2508), which upon examination proves to be quite different from those described from Brazil. However, I do not see that it differs materially from *E. dubius* Ckll., described from specimens collected by Townsend in Mexico. The South American species may accordingly be tabulated as follows:

Female sac very long (11 mm.), of peculiar shape; third antennal joint much longer than fourth; on *Eugenia*, etc., Brazil. *perplexus* Hempel
 Female sac small, less than 5 mm. long, quite ordinary. 1
 1. Third antennal joint much longer than fourth; legs smaller, anterior legs with femur plus trochanter 147 μ , tibia 78; on *Baccharis*, Brazil *braziliensis* Ckll.
 Third antennal joint little longer than fourth; joints measuring in μ , (20) 35-37, (3) 50, (4) 42-47, (5) 15-25, (6) 17-20, (7) 30-37; anterior legs with femur plus trochanter 235 μ , tibia 112-117, tarsus 105; middle legs, tibia 125, tarsus 107; hind legs, tibia 125, tarsus 120; width of anterior femur 72 μ ; claw 40 μ long, with a denticle on inner side; spines large and numerous, large ones over 60 μ long; mounted ♀ 2-2½ mm. long; antennæ very rarely 6-jointed by the union of 4 and 5; Paraguay. *dubius* Ckll. (var.?)

All three have 7-jointed antennæ. The antennæ of the Paraguayan insect are very like those of *E. quercus* Comst., and *E. tinsleyi* Ckll., but the legs are not as in these species.

NOTES ON COCCIDÆ.

By T. D. A. COCKERELL.

Pseudococcus pandani (Ckll.).

This species was described some ten years ago, from specimens found in the Marquesas Islands, and has not been received from elsewhere. The following measurements, from the type, are in μ , and are necessary additions to the original rather too brief account. They are from a ♀ containing many embryos.

Antennal joints, (1) about 50, (2) 50, (3) 45, (4) 25, (5) 32, (6) 32, (7) 35, (8) 80. Anterior leg; coxa, 140; femur with trochanter, 270; tibia, 142; tarsus, 80. Hairs of anal ring, 125; longest hair of lateral caudal patches, about 140. The sides have small patches of spines.

Three distinct groups of *Pseudococcus* have quite similar types of antennæ; these are the groups of *P. citri*, of *P. neo-mexicanus*, and of *P. longispinus*. *P. pandani* is a member of the *citri* group, and is, perhaps, a race of *citri*. It is at present an open question what should be considered the limits of *P. citri*; certainly various forms, ostensibly belonging there, present important differences, but these may be due to individual or racial variation. It will be necessary to measure carefully numerous examples from each of several different localities and food-plants, and also to find out experimentally whether all forms can live equally well on all the plants cited for the species.

Pseudococcus armatus (Hempel), var. *a*.

♀.—Ovisac pure white, long-oval, closely felted, about 3 mm. long; females greyish-black, enclosed in the ovisac and having a bunch of short cottony tassels (much like those of *P. citri*) at the caudal end; these may be seen in the opening in the posterior part of the ovisac. Boiled in caustic potash, the females are seen to be full of a blue-green pigment; a female full of eggs, mounted on slide, is 1650 μ long, 930 broad, while the eggs are long-oval, 300 μ long.

Skin with many round gland-orifices, not uniform in size; also some spearhead-like spines, 12 μ long, set in broad sockets; and a few small bristles. Anal ring ordinary, with six bristles. Caudal lobes quite prominent, mammæform; labium dimerous, short, about 100 μ long and 87 broad at base, regularly tapering to apex; legs and antennæ yellowish.

Measurements in μ : anterior leg; femur plus trochanter about 137, tibia 55, tarsus (exclusive of claw) 50; claw about 20, stout, nearly 10

broad at base, with no denticle on inner side. Hind femora plus trochanter 170–175, width of femur 47. Antennæ broken in the material examined, but joint 1 is 45 on long side, 25 on short; joint 2 is 30; the last joint is 62, and very bristly.

Larva. Antennæ and legs very stout; antennal joints (1) 22, on the longest side, (2) 15, (3) 12, with width 17, (4) 12, (5) 12, (6) 50. Hind leg: femur plus trochanter 82, tibia 45, tarsus 50.

Posadas, Argentine Republic, on *Baccharis genistelloides*, August 26, 1905 (Schrottky).

The ovisacs occur singly or a few together, but not bunched in masses. *Erium armatum* (Hempel) is also from *Baccharis*, and specimens from the type lot show that it has the same mammæform caudal lobes, the same spearhead-like spines, and the measurements of the legs and antennæ are not essentially different. I found the second antennal joint to measure 25, the last 62; the anterior leg with femur plus trochanter 142, tibia 65, tarsus 50. Hence, in spite of some differences indicated by Hempel's description, I do not like to call the Argentine insect a different species. I remove the species to *Pseudococcus*, not because it is at all typical of that genus, but because it is related as closely as possible to *P. filamentosus* (Ckll.) and *P. hymenoclea* (Ckll.). Perhaps all three should be placed in *Erium*, or else this generic name should be abandoned. The resemblance to *filamentosus* is remarkably close—so close that if the insect had not been described by Hempel, I should have hesitated to propose a new specific name for it. The occurrence of the *filamentosus* type in the Argentine Republic is of much interest, and adds one more to the known cases of species of the southern part of North America being represented by those allied in southern South America.

***Phenacoccus helianthi* (Ckll.)**

Glenwood Springs, Colorado, on a composite, apparently *Machæranthera*. New to Colorado.

The original description is not as detailed as could be wished, so I give a new one from the Colorado material, which was collected by Mr. E. Bethel.

♀.—Very pale yellowish-grey; making a long white cottony ovisac, about $6\frac{1}{2}$ mm. long and 2 broad. Boiled, it turns red, but does not stain the liquid. Skin with many round glands, about 5μ diameter; labium about 152μ long and 112 broad, regularly tapering from base to apex; hairs of anal ring six, about 145μ long. Legs light yellowish, bristly; tibia with six bristles on outer row.

Measurements in μ : Anterior leg; femur plus trochanter, 300 (width

of femur, 90); tibia, 237 (width only 32); tarsus, 100; claw with an obtuse subapical denticle.

Antennal joints: (1) 50, (2) 80, (3) 67-70, (4) 45-50, (5) 50, (6) 40, (7) 37, (8) 32, (9) 60.

Larva (in ♀) elongate, 525 μ long, 225 wide. Antennæ 6-jointed, measuring (1) 25, (2) 27, (3) 25, (4) 27, (5) 27, (6) 62.

Asterolecanium delicatum (Green).

Green's original description of this species is too brief for recognition, and as it may be some years before the full account is given in the "Coccidæ of Ceylon," I offer the following notes, taken from ♀ specimens received from Mr. Green:

Scale long-oval, light lemon-yellow, 1620 μ long, 870 broad (not counting fringe); fringe light lemon yellow, about 300 μ long.

Eulecanium fletcheri (Ckll.).

Mr. E. Bethel has found this on juniper at Glenwood Springs, Col. It is new to the Rocky Mountain region.

Kermes gillettei Ckll.

Ouray, Colorado, on oak (E. Bethel). This is the first record from the Pacific slope. The specimens are unusually small.

Hemichionaspis theæ exercitata (Green).

This Ceylonese insect was first described as a species, and then reduced to the synonymy of *H. theæ*. Green has recently restored it, at least to varietal rank, but has given it a new name, *ceylonica*. Of course the original name must be maintained.

Leucaspis Targ., 1869.

It has been alleged that this name is preoccupied. There is a *Leucaspis*, 1857, in fishes, but this may be considered to differ sufficiently, I think.

Polyclona Menge, 1856.

This supposed genus, found in amber, must be removed from the Coccidæ; it is probably dipterous. *Ochrocoris* Menge, also from amber, is probably identical with *Orthezia*.

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JANUARY 18, 1906.

The 201st regular meeting was held at the residence of Mr. J. D. Patten, 2212 R street, N. W., with the President, Mr.

Banks, in the chair. The following persons were present: Messrs. Ashmead, Barber, Banks, Burke, Busck, Caudell, Currie, Doolittle, Dyar, Gill, Girault, Heidemann, Hooker, Hopkins, Hunter, Knab, Patten, E. F. Phillips, Pierce, Piper, Quaintance, Schwarz, Titus, Uhler, Webb, and Webster, members, and Messrs. F. C. Bishopp, Douglas H. Clemons, Fred Johnson, J. D. Mitchell, A. C. Morgan, and E. R. Sasscer, visitors.

In the course of his report the Corresponding Secretary announced that Dr. L. O. Howard had recently been elected an honorary member of the Entomological Society of France and an honorary member of the Society of Economic Biologists, of England.

The Executive Committee reported that Dr. Wm. H. Ashmead had been nominated by them to represent the Entomological Society as a Vice-President of the Washington Academy of Sciences.

The Publication Committee reported that at their meeting of December 8, 1905, they had voted to continue the quarterly publication of the PROCEEDINGS OF THE ENTOMOLOGICAL SOCIETY OF WASHINGTON. By motion of the Society the report of the Committee was adopted.

The following new members were elected: Active, Messrs. J. H. Beattie, I. J. Condit, J. G. Sanders, and E. R. Sasscer, of the Bureau of Entomology, U. S. Department of Agriculture; corresponding, Messrs. F. C. Bishopp, Fred Johnson, A. C. Morgan, and C. E. Sanborn, of the Bureau of Entomology, U. S. Department of Agriculture, Miss Ella Frances Hall, of Amherst, Mass., and Mr. J. R. de la Torre Bueno, of 25 Broad street, New York, N. Y.

Mr. Banks then read his annual address as president for the year 1905, as follows:

ANNUAL ADDRESS OF THE PRESIDENT.

A PLEA FOR THE GENUS.

By NATHAN BANKS.

HISTORY.

There has been, in recent years, a strong tendency, with many entomologists, to divide old genera. This tendency has been more exploited in some orders than in others, but in nearly all groups of insects there are now many genera entirely strange to any but the specialist. Indeed, in the large orders it is impossible for one devoting himself to an entire order to become familiar with the ever-increasing flood of new genera appearing in hundreds of periodicals and journals. Almost overwhelming as it is to the specialist, is it strange that the general entomologist, the economic entomologist, and the collector of insects consider it an evil, second only to the nomenclature craze?

This multiplication of genera is due to a modification of the concept of a genus. With the early writers on entomology the genus was a very broad group, and of variable rank according to the author. Latreille, the father of modern entomology, in his first work, the "Précis," saw the necessity of fixing genera more definitely, and did so by elucidating their characters. In a few years, he, with others, assigned to genera certain species as examples or types.

There thus arose two views as to the basis of a genus. First, that it was an assemblage of species exhibiting certain peculiar characters, and second, that it was a certain type-species and forms congeneric therewith. This idea of the genotype, as an incarnation of the genus, has gathered many adherents who consider that any peculiarity of the type-species may be made the distinguishing character of the genus. With them a genus is not fixed so long as it contains two species; it may yet be divided. They care nothing for the characters of a genus, but rest all on the genotype. Indeed, genera are frequently formed on a species without the mention of any distinguishing

characters, a most ridiculous process. Some authors write the description of a new genus and species in one, and kindly suggest to the reader that "the characters of the genus may be gleaned from the above description." Anyone who attempts this gleaning process will find the field full of stones and weeds.

The other view, that a genus was definable by certain characters, held sway over systematists for at least the first half of the last century. Their idea was that when the characters of a genus were once fully given, that genus was fixed for all time. They commonly accepted the idea of a type as a species exhibiting all the characters of the genus in their full development. In fact, some of these authors cited two or more species as types of the genus. A species differing in some peculiarity was held none the less truly as belonging to the genus; or with others it might be separated in a section or subgenus. And here let me say that a subgenus is just as logical, just as natural, as a subfamily. Of course there was more or less deviation, but these were the predominant methods. With the increasing importance assigned to the genotype, there come new possibilities.

SPECIES AND GENERA ALIKE UNNATURAL.

In nature species are distinguished by all manner and degree of separation. One series of species may be separated only by differences in the genitalia of the male sex. Another series of forms may be separated not only by genitalic differences, but by color, by secondary sexual characters, by vestiture, by sculpture, by structural details, and by geographic range. One series may show species after species with slight variation; another series may display subspecies, races, aberrations, and sports in endless variety. In one case the species seem to be final, natural entities. By the other series one sees species in the course of development, their limits faint or inconstant, their characters too uncertain for language—species such as appear distinct to the eye, yet incapable of description. I know many have an idea that species are more definite than genera. As well say that the leaf is more definite than the twig, or the

twig more definite than the branch. Species, genera, families, are all parts of one great growth—a growth that still is growing, faster here, slower there.

In fact, there is all manner and degree of isolation and relation among species, some constant, some variable. The individual is the only natural unit.

Genera are broader views of species, clusters of leaves or twigs. Based on unnatural species they are of course unnatural. In attempting to place the restless, developing mass of insect life into the clothing of classification, sometimes the family will fit too tightly or the genus too loosely, and species here are not coequal to species there. As we discern these misfits it is natural that we try to adjust them.

RESULTS OF GENOTYPE METHOD.

It is evident that the more we study a species the more points we find wherein it differs from its allies. And by fixing our attention upon one species as an embodiment of the genus we narrow our ideas of the genus the more we examine the species. In our ardor to express these newly discovered differences we create new genera. Thus the logical outcome of such a process is that the genera become smaller and smaller, until the genus is equal to the species, and we could conveniently abolish genera. By applying to the subfamily and family in turn this gradual restrictive process we could abolish these terms also, and in time have nothing but species.

Just as on a tree there are scarcely two twigs of exactly the same size and shape, so there are scarcely two insects which are separable from all others by the same sum total of differences; so that the term species may be also gradually restricted until we reach the individual. Thus classification would work its own destruction.

Resting our ideas of the genus upon one species as the incarnation of the genus means that we must continually modify the generic characters, and continually narrow the limits of the genus. No insect is as yet thoroughly known. Each new student may read from the genotype new characters as generic. Considering the genus as based on a type-species will result—

is resulting to-day—in generic names destitute of significance, and subject to continual revision.

What do we gain by elevating each section of a genus into a separate genus? We gain nothing but confusion. We are no nearer a natural arrangement than before. Why must we make a new genus every time we discover a new peculiarity of a species? One examines the species of *Papilio* for days and days; result: "Why, *ajax* and *sinon* are not like the others at all, they have fine characters; they are *Iphiclides ajax* and *Iphiclides sinon*." Soon will another come along, and looking long and carefully on *ajax* and *sinon* declare: "Why, *sinon* is not an *Iphiclides*; it differs in so and so, it has fine characters, it is a new genus." Have we not seen it, and heard it over and over again!

I am not opposed to new genera. There are plenty of them awaiting discovery. But that is not the point. It is the splitting up of genera previously well defined, and the elevation of each section into a genus which, in many cases, is not as well defined as the old genus—all because the type-species is enlarged to generic proportions.

FIXED GENERA HAVE ARTIFICIAL CHARACTERS.

It is evident, therefore, that if we desire to have a fixed classification, its categories must rest on some definite, and therefore artificial, basis. We cannot continually shift the scope of our terms if we wish them to mean anything. We must give up the idea that the genus exists in nature. We must accept the genus as an artificial group, fitting more or less closely to minor breaks in the chain of life. Since the genus must be artificial, why not make it fixed and constant? Let the genus, like the family, occupy its present position in the scheme of classification, making sections under it as discoveries demand recognition. Of course there are many groups in which the genera have never been studied thoroughly, nor their characters well defined. Let us study such groups with the idea of basing the genera on structures, and not on species. Then they will have a permanent meaning, and a genus that means something is useful in a thousand ways.

If I say an insect belongs to the genus *Cicindela*, anyone who has ever collected insects knows what I mean; but let the genus be divided, and sub-divided again and again, and *Cicindela* will mean nothing, except a type-species. Emphasizing the genotype means splitting genera; emphasizing the generic characters means better-defined genera. But what characters are of generic value? No one man can answer with authority, yet we may consider a few points.

CRITERIA OF SPECIES.

First, what are the structures that should define species? The nearest we can come to the criterion of a species is its capability of interbreeding. Therefore the structure of the genital organs, or such secondary characters as are associated with them, must be the best specific characters. This includes, of course, all recognition marks or structures. No one, I think, studying insects to-day, can long resist the conclusion that sexual characters, although often more or less variable, and at times but slightly developed, are the fundamental characters of species. This vital difference in genitalia may find expression in more visible signs, recognition marks, index characters, by which the insect may know its mate. These are of many sorts, such as punctuation, color, sculpture, etc. With these necessary differences there may go accidental differences, which, although not essential, may aid in the separation of species. For example, in one fly a wing-cell may be longer than in a closely allied species. This character cannot be essential; there must be accompanying it differences in genitalia or recognition marks, or some point of vital interest to the fly. These accidental specific characters may be of much use in the tabulation of species, but we must not lose sight of their intrinsically slight value.

WHAT CHARACTERS ARE OF GENERIC VALUE?

Genera should not be based on the characters used in the separation of species, no matter how widespread or constant they may be for groups. Although we expect that the species of a genus shall have a certain uniformity in genitalia and

recognition marks, differences in these points are properly of specific value. The genus, if it is to have a meaning different from species, must have a different basis. Neither should the characters of species be grouped for the purpose of making genera; the grouping of specific characters simply indicates groups of species. It introduces no new idea to warrant the new name, genus. Basing the genus on the characters of species means reducing the genus in rank, and multiplying the genera. Never yet did an author, basing genera on the characters of species, fail to create a lot of new genera.

Again, genera should not be based, as a rule, on a single structural point, nor on two or more related points, such as long wings and elongate cells. Rather should we seek for two or more disassociated characters for the foundation of a genus.

It is almost unnecessary to state that habits or coloration should not be the distinguishing characters of a genus.

The presence or absence of a structure is of more value than the size or development of a common character.

A character that has not been restricted to close limits within the family is not of much use in the separation of genera in that family.

An extreme of a variable character should not distinguish a genus. For example, if a cell in one genus of a family is wide open, and more or less completely closed in various other genera, its complete closure or even stylation ought not to be the basis of a genus.

Striking characters, noticeable at a glance, are rarely of generic value; but minute points, especially when associated with some habit, are of great use.

Differences in the mouth-parts, in the legs and wings, are preeminently of generic importance. The antennæ and head furnish also good generic structures; the rest of the body is much less valuable in these respects. We should consider the value of a character to the insect; whether it is related to the method of life. For example, a striking difference in shape of the ovipositor indicates that the insect has a different method or place of living from its allies, and we naturally expect to find that such a form represents a genus, definable also by other structures.

NEED OF REVISION.

Daily in our work we come across genera which we well know are not good genera. Why then accept them? An author will tabulate the species of two or more genera in one synoptic key; it being evident that the characters which distinguish the genera are of less value, or are less constant, than the characters that separate the species. Such genera are worthless. They mean nothing. They are of no value to science.

There is need, sore need, of generic revision in nearly all groups of insects. If we look to the genotype as the only source of generic characters, the work will have to be done over again, and still again, and again. For each new student will look closer and more sharply than the last. Let us fasten the genus at a definite place in the scheme of classification by giving to it constant and peculiar characters, and the name will hold and mean something. The systematic entomologist can do no better work than in placing genera on the sure foundation of definite characters.

Finally, let us remember: That classification is unnatural; that a genus based on a type-species can be interpreted to suit each student; that if we desire the genus to have and to carry the same meaning at all times it must be based on definite structures; and that dividing genera brings us no nearer to a natural arrangement, while it is often a hindrance to our science.

Doctor Hopkins complimented Mr. Banks on his address and said that his experience led him to agree with the latter that the splitting up of genera without a detailed study to determine the real generic characters as distinguished from specific characters is not contributing to advancement but rather to the opposite. He thought that it was far better to classify the large genera into primary and secondary divisions and sections under one name, according to interpreted natural affinities, rather than to introduce new names for genera and sub-genera established on characters of indefinite separation from established genera.

Doctor Gill stated that there is no hard and fast line which

can be drawn in the recognition and definition of genera. The genus is as natural an assemblage as a species, or even more so. He believed that ultimately there will be substantial agreement as to what characters are of generic value. The genera of Linnæus, he stated, were in many cases very unnatural.

Mr. Caudell remarked that in his studies of the Orthoptera he had often been impressed by a fact pointed out by Mr. Banks in his address, namely, that obvious and striking peculiarities are often of no generic value. Doctor Gill said that among birds color or pattern is more or less uniform throughout the species of certain genera and is therefore a useful character in such cases. He called attention to the good work done by Leach in the erection of genera and of Kirby in creating families, in entomology. Kirby was the first to use the termination *-idæ* for families in entomology.

Doctor Ashmead believed that there are genera which may rightly be called natural. He agreed with Mr. Banks that minute or inconspicuous characters are often more stable and of more value in defining genera than conspicuous or striking ones. He believed, however, that there are good generic characters in the genitalia. The arrangement of the spiracles, also, furnishes a good character. He thought that in very many cases the subdivision of existing genera is not only justifiable but desirable and necessary, and that much of the work now being done in erecting new genera is entirely sound.

Doctor asked the question, "What is a natural group?" The farther removed from a species a group is, the more difficult is its definition and limitation. For instance, the Coleoptera with the Stylopidae removed form a natural group; with them, the order is unnatural. Mr. Banks stated that there are no good characters which serve to define all the members of any of the larger orders of insects, nor to separate and distinguish them from members of other related orders. Doctor Gill directed attention to the fact that parasitism obscures natural group affinities, and that in classifying these forms recourse should be had to embryological studies. Doctor Hopkins stated that a knowledge of the life history and habits of the species of a genus contributes greatly to a correct interpreta-

tion of structural characters and to the classification of the species into natural groups. Doctor Gill then spoke of the danger there is in relying too much on similarity of habits or mode of life as a guide to classification. With proper limitations, however, ecology may furnish useful hints.

Mr. Busck thought it a rather gloomy view to take, that the systematists should be getting away from the natural groups, and he contended that although our present arrangement of insects may not be perfect it is surely much nearer perfection than it was in the days of the old authors. Doctor Dyar said that a natural classification would be one in accord with phylogeny, while an unnatural one would not.

—The following paper, read by title, has been accepted by the publication committee:

**THE CRYPTOCERATE HEMIPTERA OF AMERICA IN THE
WRITINGS OF PROFESSOR ARNOLD
L. MONTANDON.**

By J. R. DE LA TORRE BUENO.

Prof. Arnold L. Montandon, of Bucarest, Rumania, has devoted a great deal of attention in recent years to the cryptocerate Hemiptera and has published a large number of notes and papers on them, all of great value to students of the water-bugs. American hemipterists will find these of great interest, for not only has Professor Montandon published several monographs of peculiarly American groups, but he has also described a number of new species indigenous to the Western Hemisphere, and corrected many synonymies, reviving forgotten species and establishing the distinctive characters of many obscure forms. In addition, he has paid great attention to the Pentatomidæ, especially the Scutellerinæ.

In the following bibliography are listed all the papers, so far as can be learned, which Professor Montandon has published to date on the American water-bugs; but papers upon other groups of Hemiptera, or those which deal only with Old World Cryptocerata, are omitted. It is the aim of the writer to place in concrete form before American hemipterists the importance to us of the work done by this European savant; hence the form of this list. No less important to us is an acquaintance with those forms found in Spanish America and

the Antillean islands, for many species described from the Tropics find their way north and south to more temperate regions—a fact which the tremendous range of certain water-bugs has made familiar to all students.

In the bibliography (Part I) each title will be numbered, and, to make reference easy, these numbers will be given in the systematic list (Part II) in parentheses after the names of species, genera, and higher groups. In the systematic list, also, new species will be indicated by black type, valid species will be in Roman type, and synonyms and manuscript names will be printed in italics. Valid genera will be in black capitals, and synonyms in italics. The generic names in parentheses, following any species, indicate the genus under which that particular species is mentioned by Montandon. The localities given are only those mentioned by him, and where they are omitted it is because he mentions none.

PART I. BIBLIOGRAPHY.

- (1) 1895. Hémiptères nouveaux de la section des Hydrocorises Latr. < Ann. Soc. Ent. Belg., T. xxxix, pp. 471–477.
- (2) 1895 (Dec. 12). Hémiptères Hétéroptères. Première liste et descriptions d'espèces nouvelles. (Viaggio del Dott. A. Borelli nella Republica Argentina e nel Paraguay.) < Boll. Mus. Zool. ed. Anat. Comp. R. Univ. Torino, Vol. x, No. 219, pp. 1–10 (of separate).
- (3) 1896. Hémiptères Hétéroptères exotiques. Notes et descriptions. II. Fam. Belostomidæ. < Ann. Soc. Ent. Belg., T. xl, pp. 508–520.

This paper is very important, as it contains a full discussion of the synonymy of *Benacus* and also treats of the American forms of *Belostoma* auct. (now *Amorgius*). It is extremely useful for the separation of our native species.

- (4) 1897. Hemiptera Cryptocerata. Fam. Naucoridæ, Sous-fam. Cryptocricinæ. < Verh. zool.-bot. Ges. Wien, Jahrg. 1897, pp. 1–19 (of separate).

Another important paper in which two genera are established and a number of new species described (especially in the North American genus *Ambrysus*). It contains also a general discussion of older species, with tables for the separation of all to that date in the genus *Ambrysus*.

- (5) 1897. Hemiptera Cryptocerata. Fam. Naucoridæ. Sous-fam. Laccocorinæ. < Verh. zool.-bot. Ges. Wien, Jahrg. 1897, pp. 1–20 (of separate).

The one species mentioned, *Heleocoris spinipes* Mont., is remarkable as being the only American representative of the subfamily Laccocorinæ Montandon.

- (6) 1897 (June 11). Hemiptera Cryptocerata. Revision de la Sous-fam. "Limnocatorinæ." < Boll. Mus. Zool. ed Anat. Comp. R. Univ. Torino, Vol. XII, No. 297, pp. 1-8 (of separate).
- (7) 1898. Hemiptera Cryptocerata. Fam. Naucoridæ. Sous-fam. Limnocatorinæ. < Verh. zool.-bot. Ges. Wien, Jahrg. 1898, pp. 1-13 (of separate).

This and the preceding paper are absolutely indispensable for the study of the subfamily Limnocatorinæ, so many members of which are North American. They are the most recent and complete essays on the groups treated. The second paper contains a complete table for the separation of all the species described to the date of issue.

- (8) 1897. Hémiptères nouveaux des collections du Muséum de Paris. < Bull. Mus. Hist. Nat., 1897, No. 4, pp. 124-130 (separate, pp. 1-7).

Describes one new *Cryphocriscus* and four *Ambrysus* from South America, with references to allied species of the latter.

- (9) 1898. Hémiptères Hétéroptères. Une nouvelle forme dans le genre *Ranatra*. Description d'une espèce nouvelle. < Bull. Soc. Sci. Buc., Rumania, An. VII, No. 1, pp. 1-5 (this pagination is of the separate, the only form in which I have seen this publication).

This is the first of a series of papers published in the "Bulletin de la Société des Sciences," of Bucarest, a publication inaccessible to the majority of American workers and known to me only by separates, all separately paged. In this paper under discussion a new genus of *Nepidæ*, near *Ranatra*, is established.

- (10) 1898. Hemiptera Cryptocerata. Notes et descriptions d'espèces nouvelles. < Bull. Soc. Sci. Buc., An. VII, No. 3-4, pp. 1-10.

Contains a discussion of the genus *Pelocoris* and describes new species in it, as well as one in *Ambrysus*.

- (10A) 1898. Hemiptera Cryptocerata. Notes et descriptions d'espèces nouvelles. < Bull. Soc. Sci. Buc., An. VII, No. 5, pp. 1-5 (of separate).

- (11) 1898. Hemiptera Cryptocerata. Notes et descriptions d'espèces nouvelles. < Bull. Soc. Sci. Buc., An. VII, No. 6, pp. 1-9 (of separate).

Descriptions of new species and a discussion of others of the exotic genus *Laccotrephes* in *Nepidæ*. Of interest because it also discusses our *Nepa apiculata* Uhler, and distinguishes it from the European *N. cinerea* L.

- (12) 1898. Hémiptères Hétéroptères nouveaux des collections du Museum de Paris. < Bull. Mus. Hist. Nat., No. 2, pp. 72-75.

Describes a new species of *Pelogonus* Latr. et auct. olim (now *Ochterus* Latr.) and discusses some of the other American forms of the genus.

- (13) 1899. Hemiptera Cryptocerata. S. fam. Mononychinæ. Notes et descriptions d'espèces nouvelles. 1-ère Partie. < Bull. Soc. Sci. Buc., An. VIII, No. 4-5, pp. 1-18 (of separate).

This important paper is practically a revision of the genus *Mononyx* with notes on the other genera, tables for the separation of genera in the subfamily and species in the genus. The second part deals with the exotic genera *Matinus* and *Peltopterus*, one only of the former having been recently described from America, in one of the papers under discussion.

- (14) 1899. Hémiptères Hétéroptères. Trois espèces nouvelles du genre *Zaitha* Am. et Serv., des collections du Muséum de Paris. < Bull. Mus. Hist. Nat., No. 4, pp. 170-173 (pp. 1-4 of separate).

- (15) 1900. Notes sur quelques genres de la Fam. Belostomatidæ. < Bull. Soc. Sci. Buc., An. IX, No. 2-3, pp. 1-12 (of separate).

Contains a discussion of the generic synonymy of certain of the Belostomatidæ, including *Zaitha* A. & S., and *Perthostoma* Leidy, both of which are shown to be strict synonyms of *Belostoma* Latr.; and proposes to throw *Serphus* Stål, *Pedinocoris* Mayr, and *Deinostoma* Kirkaldy into the one genus *Abedus* Stål.

- (16) 1900. Hemiptera Cryptocerata. Description d'une nouvelle espèce du genre *Amorgius*. < Bull. Soc. Sci. Buc., An. IX, No. 5, pp. 1-4 (of separate).

- (17) 1900 (July 4). Notes sur quelques Hémiptères Hétéroptères et descriptions d'espèces nouvelles des collections du Musée Civique de Gênes. < An. Mus. Civ. Stor. Nat. Genova, Serie 2^a, Vol. xx (XL), pp. 531-541.

Treats principally of Pentatomidæ, but describes *Belostoma gestroi* on page 537.

- (18) 1900. Hémiptères exotiques ou peu connus des collections du Musée National Hongroise. < Természtrajzi Füzetek, Vol. xxxii, pp. 414-422.

Describes a new American Limnocoris.

- (19) 1903. Hémiptères aquatiques. Notes synonymiques et géographiques, descriptions d'espèces nouvelles. < Bull. Soc. Sci. Buc., An. xii, No. 1-2, pp. 97-121.

Describes new species in Nepidæ and discusses others in the family, including *Nepa apiculata* Uhler, and goes more at length into synonymy of the belostomatid genera and species. Very necessary for nomenclature of the latter family.

- (20) 1903. Deux nouvelles espèces du genre *Belostoma* Latr. (= *Zaitha* Am. et Serv. et auct.) des collections du Muséum de Paris. < Bull. Mus. Hist. Nat., No. 1, pp. 21-23 (1-3 of separate).

- (21) 1905. Trois nouvelles espèces d'Hémiptères Cryptocerates des collections du Musée National Hongroise. < Ann. Mus. Nat. Hung., Vol. iii, pp. 403-406.

Describes three extremely interesting forms from South America, one being a species of the genus *Matinus* Stål, heretofore known only from Australia.

- (22) 1905. Espèces nouvelles ou peu connus du genre *Ranatra*. < Bull. Soc. Sci. Buc., An. xiv, No. 3-4, pp. 389-398.

This list of papers, as finally worked out, with an index of families, subfamilies, genera, and species added, becomes practically a preliminary check list of these families of Cryptocerata for America, and will for this reason be useful to workers in this section of the Hemiptera.

PART II. SYSTEMATIC LIST OF SPECIES, GENERA, AND HIGHER GROUPS.

Family OCHTERIDÆ Kirkaldy.

Genus OCHTERUS Latreille.

Pelogonus Latreille, olim (12).

- O. americanus Uhler (*Pelogonus*) (12).
- O. perbosci(i) Guérin (*Pelogonus*) (12).
Campeche (Mexico) (12).
- O. splendidulus Montandon (*Pelogonus*) (12).
Nanegal, Ecuador (12).
- O. victor Bolivar (*Pelogonus*) (12).
Pichincha, Ecuador (12).

Family NERTHRIDÆ Kirkaldy.

Galgulidæ, olim.

Gelastocoridæ, olim.

Subfamily NERTHRINÆ Kirkaldy.

Mononychina auct. (13) + *Gelastocorina* Kirkaldy.

Genus MONONYX Laporte (13).

Phintius Stål (13).

- M. amplicollis Stål (13).
Nueva Granada (now Colombia); Venezuela; Colombia;
Costa Rica (13).
- M. badius Herrich-Schaeffer (13) (= fuscipes Guérin) (13).
- M. bipunctatus Stål (13) (= nepæformis Fabricius) (13).
- M. fuscipes Guérin (13).
badius Herrich-Schaeffer (13).
obscurus Stål (13).
Mexico to Colombia; Costa Rica (13).
- M. fuscaconspersus Stål (13) (= raptorius Fabricius) (13).
- M. latus Montandon (13).
Nanegal, Ecuador; Nueva Granada (now Colombia)
(13).
- M. nepæformis Fabricius (2) (13).
raptorius Burmeister, Amyot and Serville, Herrich-Schaeffer (13).
bipunctatus Stål (13).
San Pablo, Argentine Republic (2); Guianas; Brazil;
Argentine Republic (13).

- M. obscurus* Stål (13) (= *fuscipes* Guérin) (13).
M. parvulus Signoret (13).
 Chile (13).
M. peruvianus Montandon (21).
 Callanga, Peru (21).
M. raninus Herrich-Schaeffer (13).
 La Guayra (Venezuela); Rosario, Argentine Republic;
 Goyaz (Brazil); Paraguay (13).
M. raptorius Burmeister, Amyot and Serville, Herrich-Schaeffer (13) (= *nepæformis* Fabricius) (13).
M. raptorius Fabricius (2) (13).
fuscoconsersus Stål (13).
 Resistencia, Argentine Republic; Rio Apa (Paraguay)
 (2); Guianas; Brazil (13).

Genus MATINUS Stål (13) (21).

- M. americanus** Montandon (21).
 Espirito Santo, Brazil (21).

Genus NERTHRA Say (13).

- N. stygica* Say (13).
 Georgia (13).

Family NAUCORIDÆ auct. (4) (7) (8) (10).

Subfamily NAUCORINÆ Kirkaldy.

- Limnocatorina* Montandon (6) (7) + *Laccocatorina* Montandon (5)
 + *Naucorina* Montandon (8).

Genus LIMNOCORIS Stål (6) (7).

Borborocoris Stål (6) (7).

- L. bergrothi** Montandon (7).
 Venezuela (7).
L. borellii Montandon (6) (18).
borelli Montandon (7).
 Bolivia (6).
L. bouvieri Montandon (7).
 Bogotá (Colombia) (7).
L. dubiosus Montandon (7).
 Chile; La Guayra (Venezuela); Nueva Granada (now
 Colombia) (7).
L. horváthi Montandon (18).
 Callanga, Peru (18).

- L. inornatus** Montandon (7).
Guatemala (7).
- L. insignis** Stål (6) (7).
Brazil (6).
- L. maculiceps** Montandon (7).
Matto Grosso (Brazil) (7).
- L. obscurus** Montandon (7).
Abejoral, Colombia (7).
- L. ochraceus** Montandon (7).
Colombia ; La Guayra (Venezuela) ; Nueva Granada (now Colombia) (7).
- L. ovatulus** Montandon (6) (7).
Salta, Argentine Republic (6).
- L. pallescens** Stål (6) (7).
Borborocoris pallescens Stål (6) (= *punctatus* Signoret MS.).
La Guayra, Venezuela ; Colombia ; Nueva Granada (now Colombia) (6).
- L. pauper** Montandon (6) (7).
Cumbase, Brazil (6).
- L. pectoralis** Montandon (6) (7) (18).
Argentine Republic (6).
- L. profundus** Say (6).
L. profundus Stål (= *stáli* Montandon) (6).
L. punctatus Signoret MS. (6) (= *pallescens* Stål) (6).
- L. pusillus** Montandon (6) (7).
Novo Friburgo (Brazil) (6).
- L. signoreti** Montandon (6) (7).
profundus Signoret MS. (6).
Mexico (6).
- L. stáli** Montandon (6) (7).
profundus Stål, nec Say (6).
Venezuela ; Guatemala ; Bolivia ; Ocana, Nueva Granada (now Colombia) (6).
- L. virescens** Montandon (6) (7).
Costa Rica ; Buenos Aires (6).
- L. volxemi** Lethierry (18).
America (?) (18).

(Subfamily *Laccocorinae* Montandon (5).)

Genus **HELEOCORIS** Stål (5).

- H. spinipes** Montandon (5).
Novo Friburgo (Brazil) (5).

Genus **PELOCORIS** Stål (10).*P. biimpressus* Stål MS. (10).*P. binotulatus* Stål (10) (21).

Rio Janeiro, Brazil; Pita, Darien (Panama); Argentine Republic (10).

P. bipunctulus Herrich-Schaeffer (10).*P. femoratus* Palisot de Beauvois (6) (10).*impicticollis* Fallou MS.*Naucoris poeyi* Guérin.**P. horváthi** Montandon (21).

Urucu Corumba, Brazil (21).

P. impicticollis Stål (2) (10) (21).*P. impicticollis* Fallou MS. (nec Stål) (10) (= *femoratus* Palisot de Beauvois).**P. magister** Montandon (10).

Novo Friburgo; Espirito Sancto, Brazil (10).

P. minutus Montandon (2).

Rio Apa (Paraguay) (2).

P. nitidus Montandon (10) (21).

L. Pita, Isthmus of Darien (Panama); Minas Geraes, Brazil; Llanos, Venezuela (10).

P. politus Montandon (2) (10).

Rio Apa (Paraguay) (2).

P. subflavus Montandon (10) (21).

Rio Grande (do Sul), Brazil (10).

Lotuca amyot Amyot? MS. (10).*Naucoris poeyi* Guérin (10) (= *Pelocoris femoratus* Palisot de Beauvois).Subfamily **CRYPTHOCRINÆ** (8) (10).*Cryptocrinae* (4).Genus **CRYPTHOCRICUS** Signoret (8).*Cryptocricus* Stål (nec Signoret) (4) (8).*C. barozzi* Signoret (4) (8).Chile (4).^a**C. macrocephalus** Montandon (8).

Alta Vera Paz, Guatemala.

Genus **AMBRYSUS** Stål (4) (8) (10).*Ambrissus* Montandon (2).**A. acutangulus** Montandon (8) (10).

Corrientes (Argentine Republic) (8).

^a This locality is Brazil, according to Champion, Biol. Cent.-Am., Het. II, p. 354.

- A. attenuatus** Montandon (4) (10).
Villa Rica, Brazil (4).
- A. bergi** Montandon (4).
Buenos Aires (Argentine Republic) (4).
- A. californicus** Montandon (4).
Southern California (4).
- A. crenulatus** Montandon (4) (8).
Ocana, Nueva Granada (now Colombia) (4).
- A. fraternus** Montandon (8).
Cuyaba, Goyaz (Brazil) (8).
- A. geayi** Montandon (8).
Darien (Panama) (8).
- A. guttatipennis** Stål (4).
Mexico (4).
- A. hybrida** Montandon (4).
Mexico (4).
- A. fucatus** Berg (4).
Tucuman and Córdoba, Argentine Republic (4).
- A. melanopterus** Stål (4).
Mexico (4).
- A. mexicanus** Montandon (4).
Mexico (4).
- A. oblongulus** Montandon (4) (8) (10).
Talamanca, Costa Rica (4).
- A. obscuratus** Montandon (10).
Pernambuco, Brazil (10).
- A. parviceps** Montandon (4).
Mexico (4).
- A. pudicus** Stål (4).
Mexico (4).
- A. pulchellus** Montandon (4).
Guatemala (4).
- A. puncticollis** Stål (4).
Texas (4).
- A. signoreti** Stål (4).
Mexico (4).
- Ambrysus** sp.? nymph (2).
San Pablo (Argentine Republic) (2).

Family BELOSTOMATIDÆ.

Genus **BENACUS** Stål.

- B. griseus** Say (Uhler, Riley) (3).
Belostoma distinctum Dufour, var. (3).
Belostoma grisea Say (3).

Belostoma haldemanum Leidy (3).

Belostoma harpax Stål (3).

Belostoma ruficeps Dufour, var. (3).

Benacus haldemanus Stål, Mayr (3).

Keokuk and Burlington, Iowa; Long Island (New York);
Rutland, Ill.; Pennsylvania; Florida (3).

Genus AMORGIUS Stål (1) (15).

Belostoma auct. (1) (10A) (15).

A. americanum Leidy (Riley) (*Belostoma*) (3).

Belostoma americanum Uhler (pro parte) (3).

B. griseum Mayr (pro parte) (3).

B. litigiosum Dufour (3).

Long Island, N. Y.; Minnesota; Lowell, Mass.; Iowa;
Fredericksburg, Va.

A. angustatum Guérin (*Belostoma*) (3).

A. angustipes Mayr (*Belostoma*) (3).

A. annulipes Herrich-Schaeffer (*Belostoma*) (3) (16).

Belostoma ruficeps Dufour (3).

B. signoreti Dufour (3).

Texas; Colorado; California; San José, Costa Rica;
Surinam (3).

A. camposi Montandon (16).

Guayaquil, Ecuador (16).

A. colossicum Stål (1).

colossicus Stål (Montandon) (16).

A. mayri Montandon (*Belostoma*) (3).

Brazil (3).

A. obscurum Dufour (*Belostoma*) (3).

Belostoma griseum Mayr (pro parte) (3).

Lowell, Mass. (3).

A. uhleri Montandon (*Belostoma*) (3).

Florida; Pennsylvania; Kansas.

Genus ABEDUS Stål (10A) (15) (19).

Deinostoma Kirkaldy (15) (19).

Pedinocoris Mayr (15) (19).

Serphus Stål (10A) (15) (19).

Stenoscytus Mayr (19).

A. breviceps Stål (19).

A. (Deinostoma) dilatata Say (19).

A. (*Pedinocoris*) *identata* Haldeman (19).

brachonyx Mayr (19).

A. (*Pedinocoris*) *macronyx* Mayr (19).

A. *ovatus* Stål (15) (19).

Stenoscytus mexicanus Mayr (19).

A. *signoreti* Mayr (19).

vicinus Mayr (19).

Genus BELOSTOMA Latreille (10A) (15) (19).

Diplonychus Herrich-Schaeffer (15) (19).

Perthostoma Leidy (15) (19).

Zaitha Amyot and Serville, Dufour, Mayr (10A) (15) (19).

B. *anurus* Herrich-Schaeffer, Dufour (*Zaitha*) (2) (19)
(= *boscii* Lepeletier and Serville) (15) (19).

Zaitha anura Herrich-Schaeffer, Champion (14) (19).

B. *asiatica* Mayr (19).

Z. asiaticum Mayr (Montandon) (19).

Z. boops Dufour, Mayr (14) (19).

B. *aurivilliana* Montandon (*Zaitha*) (14).

Colombia; Brazil; Venezuela (14).

B. *bergi* Montandon (*Zaitha*) (14).

Buenos Aires (Argentine Republic); Rio Grande (do Sul, Brazil) (14).

B. *bifoveolata* Spinola (*Zaitha*) (2) (14).

bifoveolatum Spinola (20).

Rio Apa and Asunción (Paraguay) (2).

B. *boops* Dufour (*Zaitha*) (14) (19) (= *asiaticum* Mayr) (14) (19).

B. *boscii* Lepeletier and Serville (15) (19).

Diplonychus anurus Herrich-Schaeffer (15) (19).

Zaitha anura Champion (14) (19).

Z. anurus Dufour, Mayr (2) (15) (19).

Z. cupreomicans Stål (19).

Z. subspinosa Dufour (19).

Rio Apa (Paraguay) (2); Florida; Southern United States; California; "Carolina(?)" (19).

B. *dentatum* Mayr (Montandon) (19).

Zaitha dentata Mayr (19).

Z. eumorpha Dufour, Mayr (2) (14) (19).

Santa Cruz (Mexico); Brazil; Venezuela; Guiana; Rio Beni, Bolivia (19).

B. *dilatata* Dufour (*Zaitha*) (14) (17).

- B. discretum** Montandon (20).
Sao Paulo d'Oliveira, Amazon(as) and Manaos, Brazil;
Province of Corrientes (Argentine Republic); Rio Apa
(Paraguay) (20).
- B. elegans** Mayr (Zaitha) (2).
Rio Apa (Paraguay) (2).
- B. ellipticum** Latreille (Zaitha) (19).
Zaitha elliptica Mayr, Montandon, Champion (14) (19).
Mexico (19).
- B. eumorpha** Dufour (Zaitha) (2) (14) (= *dentatum* Mayr)
(2) (14) (19).
Luque (Paraguay) (2).
- B. fluminea** Say (19).
- B. foveolata** Mayr (Zaitha) (2).
Rio Apa (Paraguay) (2).
- B. gestroi** Montandon (17).
Argentine Republic; Paraguay (17).
- B. margineguttata** Dufour (Zaitha) (14) (= *testaceopallidum*
Latreille) (14) (19).
- B. martini** Montandon (Zaitha) (14) (20).
Patagonia (14).
- B. mayri** Berg (19).
Venezuela; Guiana; Brazil; Rio Beni, Bolivia; Argentine
Republic (19).
- B. micantula** Stål (Zaitha) (2).
Rio Apa and Asunción (Paraguay) (2).
- B. noualhieri** Montandon (20).
Rio Grande do Sul (Brazil) (20).
- B. oxyura** Dufour (20).
- B. plebeja** Stål (Zaitha) (2) (20).
Buenos Aires (Argentine Republic) (2) (20).
- B. subspinoso** Dufour (Zaitha) (19) (= *boscii* Lepeletier and
Serville) (19).
- B. testaceopallidum** Latreille (10A) (15) (19) (20).
Zaitha carbonaria Dufour (19).
Z. margineguttata Dufour (14) (19).
Z. marginepunctatum Dufour (Montandon) (20).
Z. stolli Mayr (19).

Family NEPIDÆ.

Genus NEPA Fabricius (1) (11) (19).

- N. apiculata** Harris, Uhler (11) (19).
cincta Ferrari (in part) (11) (19).
New York; Illinois (19); Mexico (11) (19).

Genus CURICTA Stål (19).*Helotentes* Berg (Montandon)* (19).*Nepoidea* Montandon, Martin (1) (19).

- C. *bonaerensis* Berg (*Helotentes*) (19).
- C. *borellii* Montandon (19).
San Francisco, Argentine Republic (19).
- C. *falloui* Martin (*Nepoidea*) (19).
- C. *intermedia* Martin (*Nepoidea*) (19).
- C. *scorpio* Stål (19).
montandoni Martin (19).
- C. *suspecta* Montandon (19).
S. Leopoldo (Brazil) (19).
- C. *tibialis* Martin (*Nepoidea*) (19).
- C. *volxemi* Montandon (*Nepoidea*) (1) (19).
Santa Cruz, Mexico (1).

Genus RANATRA Fabricius (1) (9) (19).

- R. *annulipes* Stål (2) (22).
Rio Apa and Asunción (Paraguay) (2); Novo Friburgo, Brazil; Isthmus of Darien (Panama); Guadeloupe; Jamaica (22).
- R. *brevicauda* Montandon (22).
Sao Leopoldo and Santa Catharina, Brazil (22).
- R. *macrophthalma* Herrich-Schaeffer (22).
Carja, Bolivia (22).
- R. *robusta* Montandon (22).
Faro Valley, Amazonas (Brazil); Colombia; Surinam; Carja, Bolivia (22).
- R. *signoreti* Montandon (22).
Sao Leopoldo, Rio Grande do Sul, Brazil (22).
- R. *unidentata* Stål (22).
Brazil (22).

Genus AMPHISCHIZOPS Montandon (9) (19).

- A. *compressicollis* Montandon (*Ranatra*) (9).
Venezuela (9).

* Recte *Helotentes*.

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PROCEEDINGS
OF THE
ENTOMOLOGICAL SOCIETY
OF
WASHINGTON.



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THE ENTOMOLOGICAL SOCIETY OF WASHINGTON.

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The regular meetings of the Society are held on the first Thursday in each month, from October to June, inclusive, at 8 P. M., at the residences of members.

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PROCEEDINGS
OF THE
ENTOMOLOGICAL SOCIETY
OF WASHINGTON.

VOL. VIII. SEPTEMBER-DECEMBER, 1906. Nos. 3-4.

FEBRUARY 10, 1906.

The 202d regular meeting was held at the residence of Dr. P. R. Uhler, 254 West Hoffman street, Baltimore, Md. President Banks occupied the chair and there were present Messrs. Ashmead, Banks, Barber, Bishopp, Burke, Caudell, Gill, Heide-
mann, Hooker, Hopkins, Howard, Knab, Morrill, Pierce, Sanborn, Sanders, Sasser, Schwarz, Stiles, Titus, Uhler, and Webb, members, and Messrs. Clemons and Weidheimer, visitors.

Doctor Howard read a letter from M. René Oberthür, Rennes, France, who was coöperating in the efforts to introduce into the United States parasites of the gipsy and brown-tail moths, in which the latter stated that he had forwarded quite a number of brown-tail moth nests to this country; in this connection Doctor Howard read an account, published in a newspaper of that region, of the collecting of brown-tail moths' nests, in which several amusing explanations were hazarded as to the purpose of this work.

—Doctor Howard read also a letter from Mr. A. H. Kirkland, superintendent for suppressing the gipsy and brown-tail moths in the Commonwealth of Massachusetts, in which Mr. Kirkland quoted Mr. F. H. Mosher as stating that he had observed adult staphylinid beetles catching living flies. Mr. Mosher's note is as follows:

During the season of 1902 I had the opportunity to observe the feeding habits of *Staphylinus maculosus* Grav. Previous to this date I had frequently observed these beetles in the locations where they are commonly found, and had supposed that they were feeding upon the material

with which they were associated. Watching carefully, however, I observed that the beetles crept under the edge of the material, turned around, faced outward, and sprang upon flies as they came within reach. The flies were then taken into grass or under leaves near by and devoured. The beetles seemed usually to eat but two flies at a meal. Their preference seemed to be for the common blue-bottle fly (*Calliphora erythrocephala* Meig.), although a gray fly (*Sarcophaga*) was sometimes devoured. I have seen the beetles so feeding both in eastern New York and in Massachusetts.

A general discussion then ensued, Mr. Schwarz stating that the two groups of the Staphylinidæ are doubtless quite different from each other in their food habits; several species will apparently eat almost anything that comes in their way, while others seem to be strictly carrion feeders. Mr. Busck reported seeing Staphylinidæ feeding on larvæ on leaves; while Mr. Knab said he had seen them in the tropics resting idly on the vegetation. Doctor Ashmead stated that while he had never seen one of these beetles catch a living fly he knew them to be feeders on carrion and thought that they were predaceous also. Doctor Uhler reported observing *Staphylinus maculosus* feeding on dead animals and on the substance of toadstools, but on nothing else. Mr. Schwarz stated that this species is not uncommonly observed feeding on rotten fish, but he had never seen it feeding on vegetable matter. Doctor Ashmead said he had seen this or a closely related species in Florida feeding on one of the common toadstools after decay had set in. Doctor Hopkins stated that members of the family Staphylinidæ are often found in galleries of barkbeetles and that some species appear to be predaceous, while others are scavengers only.

—A query was read from Mr. G. K. Gilbert, asking about the construction of nests of *Pogonomyrmex* ants in the West, and the reasons for the pebbles and other coarser material placed on top. Discussion of this subject was participated in by many of the members. Mr. Schwarz spoke on the habits of *P. occidentalis* Cress. and Doctor Ashmead on the habits of *P. barbatus* Sm., both describing the nests as being as of the same general character—a large mound with a thick, more or less solid crust above composed of coarse material, such as cinders

(when near a railroad), pebbles, crystals, and small sticks. Mr. Barber believed that the ants cover their nests with these darker substances to conserve the heat. Mr. Knab thought that the crust is always composed of material gathered from the surface of the surrounding region. Mr. Caudell believed that the crust is simply for protection from wind and storm. Mr. Titus concurred in this and described his observations on the construction of the nests of a *Pogonomyrmex* in Colorado and the effect on the broken and unfinished nests of a high sweeping wind or a severe rain storm. He did not believe that the heat-conservation theory would hold, since in some regions the nests are covered with white crystals. It did not seem likely to him that an ant would place black substances on its nest along the railroad for any such definite purpose, while the same species, a hundred yards away, took white and red sand and gravel. Doctor Uhler described the large nests of *Camponotus pennsylvanicus* DeG. found by him near Baltimore several years ago, stating that these nests were sometimes 9 feet high and 10 feet across.

—Mr. Pierce exhibited a large series of photomicrographs taken by Mr. Barber, illustrating the morphology of some of the American Strepsiptera. Inasmuch as the subjects of these negatives are types, the negatives were denominated phototypes. The most important features brought out were the specific differences in the shape of the female cephalothorax, and also the differences in the triunguloids, or first larvæ. One print demonstrated well the fact that the female metathorax is a part of the cephalothorax. A number of prints showed the metathoracic spiracle of the female, and indicated the tracheæ as well. Mr. Pierce stated that up to that time no species had been found by him to inhabit more than one species of host. The different species are very readily recognizable from the females. Manuscript was then well in hand describing the various females and giving illustrations, as well as monographing the existent knowledge of the order.

Considerable discussion followed on the manner of distribution of triungulins, especially those of the remarkable meloid beetle *Hornia*.

—Mr. Caudell exhibited a colored drawing of a nymph of *Scudderia furcata* Brunn. This brightly colored nymph is not uncommon in the vicinity of Washington, D. C. A nymph of one species of this genus, probably the same as here mentioned, was described by Mr. J. A. G. Rehn as *Spilacris maculatus*, new genus and species in the Stenopelmatinæ.

—Doctor Stiles propounded the query, "Why does not an insect grow as large as a crow or other animal?" Considerable discussion followed, and it was asked by Mr. Banks, "Why does not a crow get as small as a beetle." Dr. Morrill thought that the insect's size was governed by the mechanical difficulty of construction of muscles and Doctor Ashmead believed that its size was limited by the fact that an exoskeleton heavy enough to contain the necessary organs and to furnish support for the muscular attachment would be too heavy to move.

—Mr. Weidheimer exhibited some well prepared specimens of *Citheronia regalis* Fab., and of what he considered to be the rarer species, *C. infernalis* Strecker.

—Mr. Banks presented a note on a proposed new classification of the Limnephilidæ, a family of the Trichoptera. He stated that the spur formula, the present basis of classification, had long been known to be defective in many cases. He had therefore sought many times for other characters, especially in the venation and in the chaetotaxy of the vertex. Differences in these respects are useful in grouping genera, but not of sufficient importance to serve as primary characters of subdivision. Recently, however, he had found a minute character which would divide the family into two nearly equal groups. This character is the presence or absence of spines on the last joint of the hind tarsi. The application of this character would divide several heteromorphous genera, as *Stenophylax* and *Halesus*. This minute difference, although seemingly trivial, is constant; at least more constant than is the spur formula. Specimens illustrating this character were shown.

—Mr. Banks presented also a note on a new classification of the ticks or Ixodoidea. The family Ixodidæ he divided

into two subfamilies, Ixodinæ, with Ixodes and Ceratixodes; and Amblyomminæ, with four tribes, as follows: Hæmaphysalini, for the genus Hæmaphysalis; Rhipicephalini, for Rhipicephalus and Boophilus; Amblyommini, for Amblyomma, Hyalomma, and Aponomma; and the Dermacentorini for Dermacentor.

—Doctor Stiles stated that he had been mistaken in some tick identifications made several years ago, and having lately had the opportunity of examining the types of several species he could now correct these errors. He had found the stigmal plate characters to be excellent. The species concerned are *Dermacentor reticulatus*, *D. occidentalis*, *D. andersonii*, and *D. quinquestriatus*. *D. occidentalis*, in his early determinations, is *D. andersonii*, and *D. reticulatus* is *D. quinquestriatus*.

—Dr. Ashmead presented a motion thanking Doctor Uhler for his kind and bountiful entertainment and expressing the pleasure of the Society in meeting with him in Baltimore. The motion was carried unanimously and Doctor Uhler responded that the pleasure was all his and that he wished that the Society could meet in Baltimore more frequently.

MARCH 1, 1906.

The 203d regular meeting was held at the residence of Lambda Chapter, Φ Σ K, 2002 G street, N. W., the Society being there entertained by Messrs. Couden, Hooker, and Morrill. President Banks occupied the chair and the following persons were present: Messrs. Ashmead, Banks, Barber, Barrett, Beattie, Bishopp, Burke, Busck, Condit, Couden, Currie, Dyar, Gill, Heidemann, Hooker, Hopkins, Johnson, Knab, Morrill, W. J. Phillips, Pierce, Quaintance, Reeves, Sanders, Sasscer, Schwarz, Titus, and Webb, members, and Messrs. J. C. Mulder and J. F. Strauss, visitors.

The Society passed the following resolution:

Resolved, That members should furnish the recording secretary with abstracts of all their communications to the Society which are not in the form of written papers, and, in case this is not done, that the reports of such communications as given

in the minutes and corrected at a regular meeting of the Society be considered as final.

The resignations from corresponding membership of Messrs. Clarence M. Weed and W. G. Johnson were presented and accepted.

The corresponding secretary, in presenting his customary report, called for donations from members of the Society of separates of their papers, published either in the PROCEEDINGS OF THE SOCIETY or elsewhere, the same to be incorporated in the price list to be published of papers offered for sale for the benefit of the Society.

M. George W. Bock, 1315 Hickory street, St. Louis, Mo., and Mr. C. F. Adams, Fayetteville, Ark., were elected to corresponding membership.

Doctor Stiles proposed the following resolution, which was adopted by vote of the Society:

Resolved, That the Society instruct its committee on publication to insist that every new generic name submitted for publication be accompanied by a definite designation of a type species, and that new generic names not so accompanied be excluded in the future from the publications of the Society.

Mr. Burke exhibited specimens of larvæ, pupæ, and adults of the ædemerid beetle *Calopus angustus* Lec., and presented the following notes:

NOTES ON THE LARVA OF CALOPUS ANGUSTUS LEC.

By H. E. BURKE.

Calopus angustus is an insect of wide range, both geographically and according to food plant. One adult was reared by the writer from a full-grown larva found in a gallery in the sound heartwood of a living western cedar (*Thuja plicata*). It had entered through the rotten wood of a hollow butt. This tree was at Pialschie, State of Washington, quite close to sea level. The larva was found July 3, 1905; it changed to pupa July 15, and issued an adult female on August 10.

On August 23 and 25 a number of small to large larvæ, pupæ, and fragments of dead adults were found in galleries in dead and living wood of Alpine fir (*Abies lasiocarpa*).

Infested trees were quite common at the timber line on Mt. Rainier, Washington—altitude about 9,000 feet. On August 27, one pupa changed to an adult male; September 3, two pupæ changed to adult females; and on September 8 another pupa changed to an adult male.

The insect seems to do extensive damage to living trees by entering small injuries and working into the surrounding living tissues, thus causing wounds that remain open, and enlarge instead of healing over.

Adults have been taken in Texas, New Mexico, Canada (Quebec), Nevada, California, Oregon, and Washington.*

The larva differs from all the other *œdemerid* larvæ of which descriptions or specimens could be found in the following grosser characters: In having no pair of ambulatorial pads on the dorsal surface of the first thoracic segment; in having pairs of such pads on both the 4th and 5th abdominal segments; in having well developed abdominal feet, instead of mere ambulatorial teats; in having a pair of these feet on the ventral surface of the 5th abdominal segment, a rudimentary pair on the anterior ventral surface of the 9th abdominal segment, and a pair of strong dark recurved hooks, with a dark depression between, on the posterior surface of the 9th abdominal segment.

The larvæ of the *œdemeridæ* illustrate very well the variation in the ambulatorial pads and abdominal legs. As nearly as could be determined from the descriptions read and specimens studied, *œdemera* is the most generalized member of the family and *Calopus* the most specialized.

œdemera larvæ, descriptions of which the writer has seen, have a pair of horny plates—probably rudimentary ambulatorial pads—on the dorsal surface of each of the dorsal segments, and no abdominal legs. Larvæ of *Ditylus* (descriptions seen), *Nacerdes* (descriptions seen and specimens examined), and *Xanthochroa* (descriptions seen and specimens examined) have ambulatorial pads on the dorsal surface of the 1st, 2d, and 3d thoracic and 1st and 2d abdominal segments, and abdominal legs on the ventral surface of the 3d and 4th abdominal segments. *Chrysanthia* (descriptions seen) has five pairs of dorsal ambulatorial pads and three pairs of abdominal legs, one pair being on the ventral surface of the 2d abdominal segment. *Oxacis* (specimen examined), *Probosca* (specimen examined), and *Asclera* (specimen examined) have six pairs of the ambulatorial pads, one being on the dorsal surface of the 3d abdominal segment, and three

* *Vide Horn*, Proc. Cal. Acad. Sci., 2d ser., Vol. vi, p. 385.

pairs of abdominal legs. *Calopus* (specimens examined) has seven pairs of ambulatorial pads; the one on the prothorax is missing, but there are two additional pairs, one being on the 4th and the other on the 5th abdominal segment. There are four pairs of the abdominal legs, one pair being on the ventral surface of the 5th abdominal segment.

—Doctor Hopkins exhibited sketches of the clypeus and labral hooks of the larva of *Calopus angustus* Lec., the beetle referred to in the previous note by Mr. Burke. From his further studies of coleopterous larvæ he had, he stated, found additional evidence to indicate that the labrum represents a primitive segment.

—Mr. Titus read the following note for Professor Webster:

NOTE ON HADENA SEMICANA WALKER AND H. MISERA GROTE.

By F. M. WEBSTER.

Late in June, 1903, the writer's attention was called to injuries to young corn in Trumbull County, Ohio, caused by noctuid larvæ, but the method of attack was quite in contrast with that of any other larvæ known to him. By rearing some of these larvæ, among which no differences whatever could be detected either in appearance or method of attack, two so-called species were obtained, viz, *H. fractilinea* Grote (now considered a variety of *H. semicana*) and *H. misera* Grote. For this reason the writer has never been able to look upon the present arrangement of these forms as satisfactory.

From larvæ one-half to two-thirds grown, taken at this time, imagoes of both forms appeared during the last days of July and up to August 10. Their method of attacking the corn was quite unique, in that they crawled up the plants and eating downward devoured the whole stem to near the roots. If the plant happened to be a small one, 2 or 3 inches high, the larva entered the folded younger leaf, but if the plant was larger it ate along the edges of the central leaves until it reached the more tender portion and then worked directly downward. At that time the writer was unable to find any published statements relative to the habits of these insects, nor has anything of that nature since appeared.

On June 13, 1905, after the lapse of twelve years, reports of injuries of a precisely similar nature, accompanied by larvæ

clearly like those observed in Ohio, were received from Mercer County, Pennsylvania, which adjoins Trumbull County, Ohio. The farmer sending the larvæ described their work, and stated that they had appeared in his section for the first time. Of course this last statement is incorrect, but it might be safely said that they had not been seriously abundant before.

While both of these so-termed species are widely distributed, it is interesting to note with what rarity they occur in destructive numbers, even in approximately the same locality.

The question of the identity of these two forms must, of course, still remain obscure until further rearings can be made. That two species, differing only or even mainly in color, whose larvæ are not distinguishable in appearance or method of attack, should inhabit the same locality and food plant would constitute an interesting biological problem.

Of the writer's Ohio specimens, *H. fractilinea* was first determined for him by Prof. G. H. French; and *H. misera* by Prof. John B. Smith, who stated that he had in his collection a specimen of this latter form taken in Colorado by Bruce, and another one bred by Dr. Otto Lugger; also several specimens of *H. fractilinea* from Doctor Lugger, which he thought were reared also.

A rather poorly illustrated note on these forms will be found in Bulletin 51, Ohio Agricultural Experiment Station, pages 139-141, figures 22 and 23, 1893.

—Doctor Stiles presented the following note:

THE TYPE SPECIES OF CIMEX LINNÆUS, 1758.

By CH. WARDELL STILES.

The writer has been requested to examine the question of the type species of the genus *Cimex* Linnæus, 1758, and to place his opinion in regard to the same on record. After an examination of the literature covering the case, he is of the opinion that *lectularius*, the common bedbug, is the type of *Cimex*. This decision is based upon the Linnæan rule. Linnæus in 1751 gave the following rule to govern the division of his genera:

"Si genus receptum, secundum jus naturæ et artis, in plura dirimi debet, tum nomen antea commune manebit vulgatissimæ et officinali plantæ."

It seems to be beyond question that *lectularius* was the most common of the species of *Cimex* mentioned by Linnæus, and

in a certain sense it is also an officinal species. Since Linnæus clearly stated the principles that govern the division of his genera, he should be taken at his word and the type should be fixed accordingly. To take Linnæus at his word results in selecting *lectularius* as the type of Cimex.

To the objection against this ruling raised by some authors, namely, that Linnæus defined Cimex as possessing four wings while *lectularius* was given without wings, it may be replied that in naming a genus we name the object, not our conception of the object. Hence the generic diagnosis given by Linnæus should not be held to be of greater importance than the distinct statement by Linnæus that in case of a division of his genera, the old generic name should follow the most common species.

—Mr. Phillips exhibited a puparium resembling that of the Hessian fly (*Mayetiola destructor* Say) taken the summer before on a native grass (*Agropyron*), at Richmond, Ind. He was unable to say whether or not it really was that of the Hessian fly. Larvæ of the latter are thought to survive only on wheat, barley, and rye, and the "flaxseeds" sometimes found on various native grasses have been supposedly the pupæ of some other species more or less closely related to the Hessian fly.

—Mr. Heidemann exhibited three new species of the hemipterous genus *Aradus* and presented the following paper:

THREE NEW SPECIES OF NORTH AMERICAN ARADIDÆ.

By O. HEIDEMANN.

Aradus shermani, n. sp.

Body narrow, very elongate ovate, uniformly deep black, and finely granulate. Head much longer than broad; apical process straight, extending beyond base of second antennal joint, rounded at tip, compressed on the sides; antenniferous processes sharply pointed, slightly diverging, and not quite reaching to tip of basal joint of antennæ; on the disk of head between the eyes is a U-shaped deep impression; the postocular part of head tumidly rounded. Antennæ smooth, as long as head and pronotum together; basal joint very short, cylindrical; the second a trifle longer than twice the length of the third, both gradually thickening towards the apex; apical joint somewhat shorter than the penultimate, fusiform, pale at tip. Rostrum slender, reaching to the

mesosternum. Pronotum sublunate, nearly flat, more than twice as broad as long, widest at the middle; lateral margins not rounded anteriorly, somewhat reflexed and sharply toothed; posterior margin widely sinuate and forming broadly rounded flaps behind the humeri; on disk of pronotum are six longitudinal lines, the last ones much abbreviated; in the female the median lines approach each other in the middle, while the male has these longitudinal lines parallel. The shield-like scutellum longer than pronotum, with two sunken points at base, and tumidly elevated before the middle. Hemelytra much narrowed towards the tip, reaching the base of the sixth abdominal segment; the male has the hemelytra broader and longer; the corium is at its base only feebly dilated exteriorly, a little upturned, the dilation not extending laterally farther than the pronotum; membrane with the veins dull black, except at base, where there is a small oblong whitish spot. Abdomen long and narrow in the female, shorter in the male; edge of abdomen finely crenulate.

Length, ♀ 7.4 mm., ♂ 6.8 mm.; width across abdomen, ♀ 3.4 mm., ♂ 3 mm.

Three females and one male, Southern Pines, N. C., June, 1904 (Sherman); Greensburg, Pa. (Wirtner).

Type.—No. 9866, U. S. National Museum.

This species might, at first sight, be easily confused with a dark specimen of *Aradus acutus* Say. But on closer examination a considerable diversity becomes evident. Say's species is larger and broader and has the antennæ stouter and longer. I have named the species in honor of Prof. Franklin Sherman, Jr., who has extensively collected the Aradidæ of North Carolina.

***Aradus coarctatus*, n. sp.**

Body compact, short, nearly subquadrate, the broadest part behind middle of abdomen. Color dark brown, with some paler spots. Head a little longer than broad; apical process much compressed on the sides; rounded in front, somewhat tapering towards tip and reaching nearly to one-third the length of the second antennal joint. Lateral spines of head broad at base, a little diverging exteriorly, extending to apex of basal joint of antennæ, and having at about the middle of sides a minute tooth; there is also quite a prominent tubercle in front of the eyes and another obtuse one on the postocular part. Antennæ very long and thick in comparison with the size of the insect; basal joint of antennæ short, only half as broad as the two following ones; the second joint abruptly pointed towards the base, in length equal to the two last joints; the third somewhat longer than the fourth; joints 2 and 3 strongly covered with close, thick, and erect squamules; terminal joint less stout and more smooth, finely hairy and whitish at tip. Rostrum

extending slightly over the front coxæ. Pronotum sublunate, a little more than twice as broad as long, and shorter than the head; the surface rather flat, remotely granulate, more densely on the posterior part of pronotum; anterior margin straight, the posterior one feebly sinuate; lateral margins anteriorly somewhat rounded, broadly reflexed and irregularly toothed, the teeth becoming finer towards the humeri; the rounded humeral flaps not prominent, with the inside margin narrowly pale; the longitudinal ridges on disk of pronotum roughly granulate, the two middle ones nearer together than the others, touching the anterior margin, the others interrupted. The scutellum seems rather small, and, as in all three specimens before me the pins are unfortunately thrust through the scutellum, a definite description of that part can not be given. Hemelytra pale, the edges, veins, and cross-veins strongly granulate, dark brown; the corium on the outer margin nearly straight, extending to base of fourth abdominal segment of the connexivum, at apex pointed; the exterior rounded expansion at base of corium not prominent, the edge a little upturned and finely denticulate; membrane brownish and the veins and spaces around them whitish. Wings iridescent. Abdomen reddish brown, with some paler marking, densely and finely granulate and minutely pubescent; abdomen at middle deeply furrowed longitudinally. Genital segment of male abruptly deflexed posteriorly, the genital lobes a little upturned, broadly rounded and incised at the inner sides. Feet yellowish white, with brown bands at middle of femora and tibiæ, and at the knees; apex of tibiæ and tarsi clouded with brown.

Length, ♂, 4.4 mm.; width across abdomen, 2.2 mm.

Three males, California (Coquillett).

Type.—No. 9867, U. S. National Museum.

This species is easily distinguished from other allied forms by the comparatively stouter antennæ and larger head. It resembles *A. ornatus* Say in the form of the antennal joints and somewhat also in robustness of body, but differs in being considerably smaller and very differently colored, and it has the widest part of pronotum behind the middle, contrary to Say's species, which has its pronotum wider towards the front.

***Aradus compressus*, n. sp.**

Body large and thin, broad, ovate; color dull black. Head longer than broad, finely granulate, the granules at the disk in longitudinal rows; the sides inside next the eyes a little excavate, with a deep sunken point before; anterior process of head very long, narrow, rounded off at tip and reaching beyond base of second antennal joint; the antenniferous spines long and very acute, the outer side straight. Antennæ in length about equal to the broadest part of pronotum; first joint shortest, cylindrical, as stout as the apical joint; the second

twice as long as the third, gradually thickening towards the apex; third joint equally thick; last joint fusiform, pale at tip; all the joints minutely granulate and a few scattered granules of a whitish color appear. Pronotum twice as broad as long; lateral margins strongly and broadly reflexed near the middle, anteriorly deeply sinuate, posteriorly rounded, then nearly rectangular next to the humeri, with a narrow yellowish edge; humeral flaps somewhat depressed; edge of lateral margins minutely dentate; anterior margin straight, narrowly carinate; posterior margin almost truncate; the frontal disk carries longitudinal prominently raised lines, the inner two approaching each other at the anterior margin, the others interrupted by the callosities, which are defined only feebly; the surface of pronotum is finely granulate, especially on the posterior part, in transverse rows. Scutellum cordate, having the margin strongly raised and the surface before the middle slightly tumid. Hemelytra long, with the membrane dull black and broadly rounded at the end; corium a little sinuate on the outer sides and the basal part only feebly dilated and reflexed, the apex reaching beyond the base of the fourth abdominal segment at the connexivum. Abdomen gradually rounded towards back of the middle, where it is widest; the upper side of abdomen blackish-brown, the posterior segmental margins somewhat elevated on the connexivum, and externally at their angles near the incisures is a small ochraceous spot; the inner margin of the female genital lobes is also edged with ochraceous; underside of abdomen at the venter flat, near the sides much compressed and marked with reddish brown; venter narrowly keeled throughout the middle. Posterior margin of the fifth ventral segment trisinuate; the sixth feebly incised at the middle, longer than the first genital segment, which is nearly thrice the length of the second; the genital lobes, seen from below, rather long, converging, but considerably apart from each other; the outer margins straight, a little knobbed in the middle, the inner margins rounded and meeting the outer angle of the second genital segment.

Length, 8 mm.; width across abdomen, 3 mm.

Two females, Washington State (Ulke); Seattle, Wash. (Uhler).

Type.—No. 9868, U. S. National Museum.

This species has a great resemblance to *Aradus ampliatus* Uhl., but differs from it essentially in the shape of the female genital lobes, which are much shorter in *A. ampliatus*, truncate at apex, and only slightly incised in the middle; furthermore, the latter has a more robust body and the pronotal sides are not sinuate anteriorly. Prof. P. R. Uhler has kindly presented me with a specimen from his collection that bears the manuscript name of *A. compressus*. In describing the species I gladly adopt this name.

Mr. Schwarz asked Mr. Heidemann how much is known of the eggs of Aradidæ. Mr. Heidemann replied that little is known concerning the eggs. He himself had found eggs of only one species, namely, *Neuroctenus simplex* Uhler. These were under the bark of oak and resembled the eggs of the bed-bug. Mr. Sanders stated that he had found eggs of *Aradus cinnamomeus* Panz. under loose bark of *Pinus inops*. They were placed in a cottony nidus resembling that of *Pulvinaria*. Doctor Ashmead stated that he had never found Aradidæ under living bark, but he had found them under the bark of orange trees killed by frost, in Florida. Mr. Heidemann stated that on two occasions he had found *Aradus brevatus* Bergroth under the living bark scales of pine trees near Washington, D. C. Mr. Burke gave it as his belief that one of the western species, *Aneurys simplex* Uhler, occurs under scales of bark of living spruce trees.

—The following paper, by Dr. G. W. Harvey, of Adin, Cal., was then read by the recording secretary:

A FEROCIOUS WATER-BUG.

(*Pedinocoris macronyx* Mayr.)

By G. W. HARVEY, M. D.

In the warmer streams and ponds of California lives a creature whose character is aptly portrayed by the word ferocious. He might be termed a giant for his fierceness and strength were it not for the fact that the so-called electric light bug is a neighbor of his and about twice his stature. Among the children who go wading in the streams this bug is known as "toe pincher," because he frequently mistakes their toes for lawful quarry and thrusts savagely into them with his scimitar-like proboscis. They tell me that his bite is very painful, though not at all dangerous.

Scientifically this bug bears the title of *Pedinocoris macronyx*. It is of a uniform dull brown color, with a barely perceptible mottling on the elytra. The females are possibly a shade darker than the males. It has protruding beady black eyes, and its head terminates in a long curved proboscis about 7 millimeters in length, which gives it a very odd and savage appearance. Its legs are hairy, and armed with sharp curved claws, very long and prominent on the two front legs, which

are placed well forward and work in a vertical plane. These legs are jointed at a very acute angle in the second joint, and the claws on them can be bent down upon the first joint of the leg, thereby clamping the prey as in a vice. It is with these powerful and formidable front legs that it captures its prey. In size it is $3\frac{1}{2}$ centimeters long, with a reach of $1\frac{1}{2}$ centimeters more to its front legs and a breadth of 2 centimeters across the back.

Nature has gifted this bug with a voracious appetite. Its aggressive prowess as a hunter is something appalling to the owner of an aquarium who chances to secure a specimen, and I well remember my first experience with it. My aquarium contained a beautiful collection of aquatic insects, fish, snails, tadpoles, etc., from the streams about Watsonville, Cal., and it was on a collecting ramble that I discovered *Pedinocoris*. To me it seemed a wonderful insect and I took it home highly elated over the prospect of a new creature to study. That night I placed it in the aquarium and I was around early the next morning to see how it had fared in its new quarters. Imagine my astonishment to find it sitting complacently on a stalk of *Sagittaria* devouring a beautiful trout, almost, if not quite, 3 inches long, while all about were scattered the exsufficated skins of many victims—young frogs, tadpoles, fish, snails, and various smaller fry. He had fared altogether too well—much like a weasel in a hen-house. At that rate my aquarium would soon be totally depopulated, so I removed the bug to less commodious and more sparsely populated quarters, and confined it to a diet of tadpoles and young frogs. Of these it would devour dozens in the course of twenty-four hours. The prey were captured, as they swam near, by a sudden dart forward. The hooked front legs were suddenly thrown over the victim, and the sharp proboscis was thrust into the quivering flesh, not to be withdrawn until the skin was a limp and flabby sack of lifeless refuse.

The habit of *Pedinocoris* was to lurk in the most secluded and darkened places, backing up occasionally to the surface for a breath of fresh air, and quite often, after returning to the lurking place, raising and lowering the wing-sheaths as though breathing, for beneath these could be seen a large bubble of air, advancing and receding with the up and down motion of the wings. When I took it from the water it would play possum for five or even seven minutes, but when aroused it was full of life, and if held firmly for a moment or two it would eject a few drops of clear liquid, even to a distance of 3 or 4 feet.

Occasionally, it would come stealing to the surface where

a thick mass of duckweed was floating, extrude the spiracles, and make a soft chirping noise, not unlike a subdued cricket song. It was some time before I could make out just where the music came from, but I finally succeeded in observing the act, and verified it a number of times. That a song could emanate from so odd a source as the rectal spiracles of a water bug seemed unnatural, but such is the fact. When the bug was engaged in chirping one had to look very closely among the duckweed to discover the spiracles, but, once found, a rhythmical contraction and relaxation could be distinctly observed with every note of the song, which was produced much more slowly than that of our cricket.

The breeding season of this water bug at Watsonville, Cal., where it is very abundant, is from April to June, and during this time from two to four sets of eggs are hatched. The eggs are glued tight and fast to the back of the male, and there they stay through the whole period of incubation. Upon the wing sheath of the male is first spread a drop of mucilaginous adhesive. Into this drop of adhesive are fastened the eggs, one at a time, closely together, at all angles from perpendicular in the center of the clutch to a cant of 45° at the edges of the wing sheaths. From 70 to 175 eggs are deposited upon the back of the male, but not all at one time. Part of them will be deposited one night and the rest the next or succeeding nights. This work is all done in the dark and I was never fortunate enough to observe it. If a spot of two, three, or more eggs is missed, it is filled in afterwards, and should some of the eggs prove to be infertile, these drop off and are replaced by others as late as the sixth or eighth day of incubation.

Incubation lasts from ten to twelve days, at the end of which time the egg cases and adhesive nidus that holds them are cast off entire, providing there be no late-laid eggs, in which instance the empty egg cases and nidus remain attached until all are hatched. The cast-off mass of egg cases and nidus resembles a knobbed shield, being oblong-oval, with the concave side towards the male's back. The eggs are 5 millimeters long by 1 millimeter thick and are of the same color as the parent. During the period of incubation the male spends much of his time in aerating the eggs. This is accomplished by gently raising and lowering the wings so that the air taken in at the surface and held under the wing cases is moved back and forth beneath the mass of eggs, and taken up a little at a time. If by any chance the male should be removed from the water for a few hours during incubation, the whole mass of eggs—nidus and all—loosens and comes off.

At the end of incubation the male comes to the surface and

with his back partly out of the water the young begin to appear. The first thing seen after the rupture of the egg case is a pair of beady black eyes. At the first appearance of the young the male begins raising and lowering the wings, at the same time going through a jerking manœuver at regular intervals. The young insect is extruded from the egg by easy stages, the hatching being accomplished in from seven to twenty-five minutes. At birth the young bug is about 5 millimeters long by 2 millimeters broad, of the purest white, rapidly changing to a light straw-yellow and brown. In two or three hours at most it is of the same color as the parent and, if prey be not abundant, very likely feasting on its fellows. This latter trait is evidently hereditary, since the parent often makes a meal of its own offspring.

These bugs disdain nothing for food that they can handle, dead or alive. They often come to the surface for floating insects, worms, moths, butterflies, dragonflies, grasshoppers, crickets, caterpillars, etc., and after extracting all the nourishing properties cast the skins aside. Their migrations are made at night.

Mr. Burke stated that the range of this species extends up into the eastern part of the State of Washington, and that there its common name is "toe-biter," not "toe-pincher."

APRIL 5, 1906.

The 204th regular meeting was held at the residence of Dr. Wm. H. Ashmead, 1807 Belmont avenue, N. W. President Banks occupied the chair and the following members were present: Messrs. Ashmead, Banks, Caudell, Currie, Hopkins, Knab, Quaintance and Titus.

By vote of the Society the Executive Committee was instructed to take action relative to the storing of the publications of the Society in some fire-proof storage building.

Doctor Hopkins exhibited a drawing of the reproductive organs of females of the genus *Pissodes* and explained the use and mechanism of the spermatheca in these beetles.

—Doctor Hopkins showed also some hibernation cells of larvæ of the locust borer (*Cyrtene robinia* Forst.), a cerambycid beetle. These are formed just beneath the outer corky bark and in the outer portion of the living inner bark of the black

locust (*Robinia pseudacacia*). The wound thus produced results in a small dead area surrounding the cell, which was found to extend through the thick inner bark to the wood itself. The hibernating larvæ are very small. Normally but one egg is deposited by the beetle in a place, instead of clusters of from 4 to 9 as stated by Gen. H. A. S. Dearborn, who was the first to record the more important facts in the life history and habits of this insect. The beetle selects healthy spots for oviposition, thus making the injury more extensive than it would otherwise be. The dead portion of the plant tissue around the larval cells resembles somewhat the bark killed by the pear blight and seems to be of a similar nature.

—Mr. Caudell reported that assistants of Mr. A. H. Kirkland, Superintendent for Suppressing the Gipsy and Brown-tail Moths, had lately taken from 25 to 30 cocoons of a Japanese limacodid moth (*Cnidocampa flavescens* Walk.) near Cape Cod, having mistaken them for those of the gipsy moth. This species was introduced into North America many years ago, but has not been taken before in the Cape Cod region, so far as known. In this connection Mr. Caudell stated that Doctor Dyar had experienced considerable difficulty in inducing bred limacodid moths to mate in captivity. Mr. Knab stated that, as regards chrysomelid beetles, most of those that emerge in the fall do not mate until the following spring, and he thought that some similar explanation might account for this failure to mate in the case of the limacodids. Professor Quaintance stated that he had a record for the plum curculio in which specimens mated in summer almost immediately after emergence from the pupa, and larvæ therefrom were reared almost to maturity. Doctor Hopkins stated that in Europe bark weevils of the genus *Pissodes* do not mate until a year after they emerge and are known to live three years and to oviposit each year. Mr. Knab stated that he had reared the larva of the cerambycid beetle *Orthosoma brunneum* Forst. to the pupa in an old railroad tie. Doctor Hopkins stated that larvæ of the locust borer (*Cyrtene robinia* Forst.) develop, transform, and emerge from a gallery little more than twice the length of the full-grown larva. Larvæ under dry conditions completed their

development and emerged thirty days earlier than those under moist conditions. Professor Quaintance said that the same thing holds true for the peach borer (*Sanninoidea exitiosa* Say), the larvæ from nearly dead trees transforming before those from trees which are living and more or less vigorous. He then described the method of birth and the prolificacy of the black peach aphid (*Aphis persicæ-niger* Er. Sm.) no males or eggs of which, as is also the case with the cabbage aphid (*Aphis brassicæ* L.) and the cotton or melon aphid (*Aphis gossypii* Glov.), have ever been found. Mr. Titus stated that some specimens of the melon aphid had been known to reproduce agamically for two years. During all this time they were under observation and it was known that no eggs were laid.

—Mr. Banks made some remarks on the classification of the Perlidæ and on the characters which he had found to be most valuable in the separation of the various groups. Doctor Hopkins asked him whether there were good sexual characters in the Perlidæ, and Mr. Banks replied that there are characters in the anal plate. Doctor Ashmead said that there are characters in the anal veins of saw-flies, but that these disappear in the higher Hymenoptera.

—Mr. Knab made some remarks on the habits of South American passalid beetles. Among other things he stated that they seem to be monogamous. The larvæ are cared for by the adults, and this care is evidently necessary to the larvæ.

—Doctor Ashmead reported the taking of a ponerid ant, *Leptogenys falcigera* Rog., in the Philippines. It had previously been recorded from Ceylon and Madagascar.

—Mr. Banks presented the following paper:

A REVISION OF THE NEARCTIC CONIOPTERYGIDÆ.

By NATHAN BANKS.

(PLATES VI, VII.)

The Coniopterygidæ are a small and peculiar family of the true Neuroptera. One of the most characteristic marks of the family is the mealy exudation upon the wings and some parts of the body. More vital structures, however, distinguish the group from its allies. The antennæ are short, moniliform,

and hairy; the wings have very few transverse veins, rarely as many as 10, and no series of costal cross-veins such as is found in all other true Neuroptera, nor are the veins forked just before the margin as in nearly all allied forms. The maxillary palpi have five joints, the last joint longer and more slender than the others; the labial palpi have three joints, the last joint large and compressed. There are no ocelli. The hind wings are smaller than the front pair, without anal space, and the margin is very minutely ciliate. The legs are moderately long; the middle and hind tibiae are often fusiform; the tarsi are of five joints, the basal joint the longest; the claws are simple. The abdomen is shorter in the male than in the female; the genitalia are not very distinct; but I have figured their shape in the males of two species.

The adults can be collected from various trees and shrubs in late spring and summer by beating.

I have found the larva of *Coniopteryx* several times on the leaves of various trees at and near Washington, D. C. It is a rather flat, fusiform larva, broadest on the mesothorax, having a triangular head, with the middle portion slightly extended, and antennae that are two-jointed and cylindrical. The color is dark reddish or brown, with bands and spots of white. The tip of the abdomen ends in a slender sucker. In California Professor Woodworth has observed the larva of a *Coniopteryx*—a mottled black and white larva—sucking the eggs of the red spider. He noticed that when fully grown it spun a double cocoon, made up of an outer flat layer and an inner spherical case.

In Europe the larvæ of two genera, *Coniopteryx* and *Aleuropteryx*, have been described by Löw. The former has a very slender beak and slender palpi; the antennae are also simple, of two joints, the second much the longer and tapering to the tip. In *Aleuropteryx* the beak is short and broad at base; the palpi have the terminal joint greatly swollen; the last joint of the antennae is truncate at tip and rather broader there than elsewhere, and has a long bristle; the body is more slender than in *Coniopteryx*.

The *Aleuropteryx* larva was found feeding on scale insects on a pine tree. It pupated in a double cocoon, composed of an inner dense spherical case and some loose outer layers. It remained in the pupal state twenty days. Dr. Löw, who bred this larva, believed that there were two generations in a year. I think that our eastern species have two generations each year, as Mr. J. H. Emerton has recently bred *Coniopteryx vicina* from cocoons found during the winter.

These tiny mealy-winged insects were a puzzle to the early

entomologists, yet the first species described—by Müller in 1767—was placed correctly in Hemerobius, as that genus was then understood. Other authors, however, placed them in the caddice-flies, in the Psocidæ, and in the Aleyrodidæ. Westwood was the first to show their true position, and Burmeister the first to consider them a distinct family.

Very little work has, until recently, been done on the Coniopterygidæ, either in this country or in Europe. In 1885 Dr. Franz Löw published a revision of the then known European forms, and recently Dr. G. Enderlein of Berlin has given us several papers, including an elaborate classification and a monograph. On one important point, however, I differ from that author as to the type of the genus Coniopteryx. Curtis^a gives *C. tineiformis* as the type of his genus Coniopteryx, and gives figures of the venation. In his generic description he says that there are three closed cells in both wings; and the figures show that in the hind wing the median vein is forked as well as the radial sector, and that in the fore wings the connecting veinlet from the cubitus runs into the lower branch of the median vein, instead of directly into the median vein; in other words, the venation is on the same plan as Löw figures for *C. aleyrodiformis*. Löw considers that Curtis had two species in his *C. tineiformis*, for Curtis says, "antennæ about 25 joints," and the size given is too small for *C. aleyrodiformis*. He admits that the form Curtis figures is *C. aleyrodiformis*, while the form fitting to the size and antennæ, he says, is *C. lactea* Wesm. Curtis may not have been careful in counting the antennal joints, for it is not easy to be sure of their number, and the size as given by him may have been a misprint. But even if Curtis did have two species before him, surely the name must hold for that form which he figures, and to which figures he refers in both the specific and generic descriptions. This reference in the specific description to the figures makes the venation exhibited by the figures an integral part of the description, a part fully as important as the number of antennal joints or the size. Moreover, Tullgren, in a recent paper on the Swedish species, claims that the male of *lactea* Wesm. has 28 joints in the antennæ instead of 25, so that the differences in this respect between the two forms is less than was supposed by previous writers. There cannot be the faintest doubt as to what the figures of Curtis represent, and since he considered them typical of both genus and species, they must stand for *C. tineiformis*, rather than the doubtful supposition that Curtis had *C. lactea* before him, a form totally at variance with the figures.

^a Brit. Entom., 1834, Plate 528 and text.

Enderlein^a has made a new genus, *Semidalis*, for *C. aleyrodiformis*, but, as I have shown, Curtis's own figures show that *C. tineiformis* has the same venation as *C. aleyrodiformis*; therefore *Semidalis* is a synonym of *Coniopteryx*. Wesmael described his species as *Malacomyza lactea*, and the genus is a good one. Fitch based his genus *Aleuronia* on a precisely similar form; therefore it is a synonym of *Malacomyza*.

SYNOPSIS OF GENERA.

1. Radial sector of fore wings simple; median vein with two branches; hind wings large and with two forks.....*Aleuropteryx*.
Radial sector of fore wings forked; median vein with but one branch2
2. In fore wings the cross-vein from cubitus runs into the lower branch of median vein (not into median itself); two forks in hind wings.
Coniopteryx.
In fore wings the cross-vein from cubitus runs into the median vein before the fork3
3. Hind wings very small and narrow, only one-half the length of fore wings; in hind wings the radial sector is not forked nor does it reach the margin*Contwentsia*.
Hind wings but little smaller than front pair.....4
4. In hind wings both the median vein and the radial sector are forked.
Parasemidalis.
In hind wings the radial sector is forked, but the median vein is simple*Malacomyza*.

Genus CONIOPTERYX Curtis.

Coniopteryx Curtis, Brit Ent., xi, tab. 528, 1834.

Coniortes Westwood, Introd. Mod. Class. Ins., ii, p. 49, 1840.

Semidalis Enderlein, Wien Ent. Zeit., 1905, p. 197.

Head rather longer than broad, much smaller than the thorax; second joint of antennæ without tooth below in male; tibia of middle and hind legs slightly swollen in the middle. In the fore wings the radial sector is forked once, and likewise the median vein; the cross-vein from the cubitus connects to the lower branch of the median vein beyond the fork. The hind wings are about two thirds the size of the fore wings, and are similarly veined, showing two forked veins.

Type: C. tineiformis Curtis (fig. 9 of Curtis's plate).

Coniopteryx vicina Hagen (Pl. VI, fig. 5; Pl. VII, fig. 10).

Head pale yellowish brown, vertex darker; antennæ pale yellowish, hairy, in female very slender, in male somewhat heavier, of about thirty joints (I think there is some variation). Thorax dark brown.

^a Wien. Ent. Zeit., 1905, p. 197.

Abdomen nearly black. Legs brown, mealy; the hind tibia plainly fusiform, one and one third times as long as femur; tarsi short. Wings dark, mealy (when not rubbed), the extreme outer margin of fore pair often pale. Venation as figured, the veinlet connecting subcosta and radius about its length or more beyond the veinlet closing discal cell; no cross-vein between first and second anal veins. In hind wings the venation is very similar to that of fore pair; the hind wings in both sexes reaching beyond discal cell of fore wing. The apical and posterior margins in both pairs are minutely ciliate. The abdomen of male is very short, and ends as in figure; in female it is nearly twice as long and swollen in the middle.

Length, 2.6-2.9 mm.

I have specimens from Sea Cliff and Hamburg, N. Y.; Lakehurst, N. J.; Plummers Island, Maryland, and Falls Church, Va. I have examined Hagen's type in the Museum of Comparative Zoology; it has outer margin of forewings pale; it is from Washington, D. C. This is our most common species.

Coniopteryx angustus, n. sp. (Pl. VII, fig. 8).

Very similar to *C. vicina*, but the fore wings are more elongate and slender, the apical margin not pale. Venation like *C. vicina*, except that the veinlet connecting subcosta and radius is fully three times its length beyond that closing the discal cell; and that the forks of the radial sector are longer. In the male the upper genital appendage tapers toward tip, while in *C. vicina* it is rather clavate.

Length, 3 mm.

Specimens from Claremont, Cal. (Baker), and Williams, Ariz. (Barber and Schwarz), U. S. N. M.

Genus PARASEMIDALIS Enderlein.

Parasemidalis Enderlein, Wein. Ent. Zeit., 1905, p. 197.

Similar in many respects to *Malacomyza*, but with rather larger front wings and more slender, while the hind wings have both the radial sector and the median vein forked, and reaching to the posterior margin.

Type: P. annæ Enderlein.

Parasemidalis flaviceps, n. sp. (Pl. VII, fig. 9).

Head yellow; antennæ yellowish, of about 38 joints; thorax and abdomen dark; legs brown, mealy; hind tibia slightly fusiform, not one fourth longer than femur, tarsi rather long, the basal joint longer than usual. Wings dark, mealy; venation as figured, the cross-vein connecting subcosta to radius is about twice its length beyond that closing the discal cell; the cross-vein from median to cubitus is oblique

(not transverse as in *Conwentzia* and *Malacomysa*); a veinlet connecting cubitus and first anal present. In hind wings, which are long and slender, reaching beyond discal cell of fore wings, the venation is similar to that of the front pair, but the branch from the radial sector seems to be rather a branch from the median; margins of wings minutely ciliate.

Length, 3.6 mm.

Two specimens from Los Angeles, Cal.

Genus *CONWENTZIA* Enderlein.

Conwentzia Enderlein, Ber. West-preuss. Bot.-Zool. Ver., 1905, p. 10.

Head rather longer than broad, smaller than the thorax; antennæ simple; tibia of middle and hind legs swollen in middle. Fore wings rather long, both radial sector and median vein forked once; connecting veinlet from cubitus ends in the median before the fork of the latter; the hind wings are scarcely more than one-half as long as the fore pair, and less than one-half as broad, being rather strap-shaped; neither the radial sector nor the median vein is forked, and they do not reach the posterior margin of the wing.

Type: C. pineticola Enderlein.

Conwentzia hageni, n. sp. (Pl. VI, figs. 3, 4).

Head black; antennæ brown, of about 35 joints, more slender in female than in the male; thorax and abdomen brown, male abdomen very short, in female as long as hind wing; legs dark, hind tibia slightly fusiform, one fourth longer than femur, tarsi rather short. Wings pale, mealy; barely ciliate on margins, the cilia being extremely minute. Fore wings rather long, venation as figured, the cross-veinlet from radius to subcosta varies somewhat in position, as well as that from fork of radial sector to the upper branch of median. The hind wings are very short in both sexes, slender and strap-shaped; with but few veins barely reaching the margin.

Length, 3.6 to 4 mm.

I have specimens from Sea Cliff, N. Y.; Washington, D. C.; Falls Church, Va., and Aurora, W. Va., but it is not as common as *Coniopteryx vicina*.

Genus *ALEUROPTERYX* Löw.

Aleuropteryx Löw, Sitzungsab. Kais. Akad. Wiss. (Math. Natur. Cl.), xci (1), p. 79, 1885.

Head as broad as long, a little smaller than the thorax; antennæ of male with a tooth below on the second joint; tibia of middle and hind legs not swollen in the middle. In the front wings the radial sector is simple, and the median vein has two branches; the cross-vein

from the cubitus ends in the median much before the forking of the latter vein. The hind wings are but little shorter than the fore pair, and have both radial sector and median vein forked, and reaching the posterior margin.

Type: A. lowii Klapalek.

This genus was supposed by the author to be based on *A. lutea* Wallengren, but it has been shown that Löw's species was not the same. Enderlein has recently^a made a new genus—*Helicoconis*—for *A. lutea*, but the differences, in my opinion, are altogether too slight to be of generic importance; the exotic species he places in this genus probably represent two new genera.

***Aleuropteryx walshi*, n. sp. (Pl. VI, figs. 1, 2).**

Head yellowish; antennæ yellowish, short, of about 24 joints; thorax brownish; abdomen yellowish brown; legs brownish, hind tibia not swollen, tarsi long and slender. Wings pale, somewhat mealy (specimen partly rubbed), margins with long cilia, those on costal margin shorter than elsewhere. Wings with venation as figured, the cross-veins in groups, the cross-vein from subcosta to radius only a little beyond that closing discal cell; four basal cross-veins present; in the hind wings the radial sector arises near the base of wing and is forked before the oblique cross-vein closing the discal cell; the median and cubitus in basal half of wing run close together.

Length, 4.5 mm.

One specimen from Agricultural College, Mich., 3 July (Pettit Coll.). It appears to be more like *A. lowii* than like *A. lutea*.

Genus MALACOMYZA Wesmael.

Malacomyza Wesmael, Bul. Soc. Sci. Bruxelles, III, pp. 166, 214, 1836.

Sciodus Zetterstedt, Ins. Lapp., p. 1050, 1840.

Aleuronina Fitch, Nox. Ins. N. Y., 1, p. 97, 1856.

Head longer than broad, much smaller than the thorax; second joint of male antennæ simple; tibia of middle and hind legs slightly swollen in middle. Fore wings rather shorter than in the other forms, radial sector and median vein both with one fork, the connecting veinlet from the cubitus ends in median vein much before the fork of latter. In the hind wings, which are only a little shorter than the fore pair, the radial sector is forked, but the median vein is simple, and all the veins reach the margin.

Type: M. lactea Wesmael.

^a Zool. Anz., XXIX, p. 226, 1905.

SYNOPSIS OF SPECIES.

1. In front wings the cross-veinlets in apical half fairly distinct.....2
 In front wings the cross-veinlet connecting cubitus and median vein
 distinct; the others almost invisible; in hind wings the radial
 sector has a long fork*westwoodi*.
2. In hind wings the radial sector has a long fork.....*fitchi*.
 In hind wings the radial sector has only a very short fork, close
 to the margin*farinosa*.

Malacomyza westwoodi Fitch (Pl. VII, fig. 7).

Head yellowish; antennæ brown, of about 24 joints, thicker in the male than in the female; thorax and abdomen brown; legs brown, hind tibia barely swollen, tarsi rather long. Wings dark, mealy, with extremely minute cilia around edge, some on hind margin of hind wings quite long. Venation as figured; the cross-veins in outer part of fore wings very faint and indistinct, except that connecting cubitus and median; this one is very prominent. The hind wings are long; the radial sector arises near base and has a long fork, as long as the pedicel; the median is simple, no cross-veins are visible, except that connecting median and cubitus.

Length, 2.4 mm.

Specimens from Falls Church, Va., and Lakehurst, N. J., in May and August. Fitch's specimen was from central New York; I do not think it is now in existence, but his description leaves no doubt as to the species.

Malacomyza fitchi Banks (Pl. VII, fig. 6).

Head brownish; antennæ yellowish, slender in female, heavy in male, of about 28 joints; thorax brownish; abdomen yellowish; legs pale, hind tibia not swollen, tarsi long. Wings pale, with long cilia around outer and posterior margins, short on front margin. Venation as figured, forks of radial sector longer than discal cell, the veinlet closing discal cell and that next below out some distance on the forks (not at base as in other species), the veinlet between median and cubitus at least its length before the fork of median; in one specimen the veinlet to subcosta is just above that closing the discal cell. In hind wings, which are almost as long as fore pair, the radial sector has long forks, and the median is simple.

Length, 2.5 mm.

Besides the type from Colorado, I have one specimen from Onaga, Kans. (Crevecoeur), which agrees in all essential points.

Malacomyza farinosa, n. sp. (Pl. VII, fig. 11).

Head brown, small; antennæ pale yellowish brown, of about 26 joints; thorax brown; abdomen yellowish; legs pale brownish, mealy, hind tibia barely swollen, one-fourth longer than femur, tarsi long. Wings pale, mealy, minutely ciliate on margins, venation of fore wing as figured; the cross-vein between cubitus and median more than its length in front of the fork of median; forks of radial sector fully as long as discal cell. The hind wings are long and reach much beyond discal cell of fore wings; the median vein is not forked; the radial sector is forked only near tip, so that the pedicel from discal cross-vein is twice as long as the fork.

Length, 2.7 mm.

One female from San Mateo Co., Cal. (Baker). Readily known by short fork of radial sector in hind wings.

CATALOGUE.

Genus CONIOPTERYX Curtis.

C. vicina Hagen, Syn. Neur. N. Amer., p. 197, 1861.

C. angustus Banks, n. sp.

Genus PARASEMIDALIS Enderlein.

P. flaviceps Banks, n. sp.

Genus CONWENTZIA Enderlein.

C. hageni Banks, n. sp.

Genus ALEUROPTERYX Löw.

A. walshi Banks, n. sp.

Genus MALACOMYZA Wesmael.

M. westwoodi Fitch, First Rept. Ins. N. Y., p. 98, 1856.
(*Aleuonia*.)

M. fitchi Banks, Trans. Amer. Ent. Soc., XXII, p. 315, 1895.
(*Coniopteryx*.)

M. farinosa Banks, n. sp.

EXPLANATION OF PLATES.

- FIG. 1. *Aleuropteryx walshi*: fore wing.
 2. *Aleuropteryx walshi*: hind wing.
 3. *Conwentzia hageni*: hind wing.
 4. *Conwentzia hageni*: fore wing.
 5. *Coniopteryx vicina*: fore wing.
 6. *Malacomyza fitchi*: fore wing.

7. *Malacomyza westwoodi*: fore wing.
 8. *Coniopteryx angustus*: male genitalia.
 9. *Parasemidalis flaviceps*: fore wing.
 10. *Coniopteryx vicina*: male genitalia.
 11. *Malacomyza farinosa*: fore wing.
-

In the discussion which followed Doctor Ashmead stated that he had found *Coniopteryx* feeding on a red spider (*Tetranychus*) on rose leaves. He had also found it eating aphides.

MAY 10, 1906.

The 205th regular meeting was held at the residence of Mr. O. Heidemann, 531 Randolph street, N. W., Petworth, D. C. Vice-president Hopkins occupied the chair and there were present Messrs. Busck, Caudell, Currie, Hopkins, Knab, Patten, and Piper, members, and Mr. Douglas H. Clemons, visitor.

Mr. W. W. Yothers, of the Bureau of Entomology, U. S. Department of Agriculture, was elected a corresponding member.

The Executive Committee reported that they had rented a room of the Security Storage Company, of Washington, D. C., for the storage of the publications of the Society.

Doctor Hopkins reported finding the larva of *Pissodes dubius* Rand. in balsam fir in New Hampshire, in the splintered portion of storm-broken trees. There was none of this species, however, in the trees which died of a root fungous disease. The work of *Dendroctonus piceaperda* Hopk. was found at altitudes above 2,000 feet, but none below. Old galleries were observed which must have been made some thirty or forty years ago.

Mr. Busck presented the following paper:

NEW AMERICAN TINEINA.

By AUGUST BUSCK.

Family YPONOMEUTIDÆ.

Choreutis schausiella, n. sp.

Antennæ blackish brown, checkered above with white, and with long ochreous cilia. Labial palpi dark brown, liberally sprinkled with white

scales on second joint and in the tuft; terminal joint dark. Head and thorax dark brown. Basal half of fore wings ochreous brown, very sparsely sprinkled with white scales; in this brown part is a narrow oblique fascia of bluish metallic scales from basal third of costa to the middle of the dorsal edge; this fascia is joined in the middle of the wing by another bluish metallic streak from the middle of costa and together they form a perfect though not very distinct Y. Just beyond the middle of the wing the basal unspeckled part is rather sharply terminated and the rest of the wing is profusely speckled with ochreous white. At tornus is a large, deep-black, elongate quadrangular spot, divided in the middle by a narrow perpendicular ochreous-brown line; the basal part of the spot contains a large center of bluish metallic scales, and the apical part contains a perpendicular line of such scales. The nearly unspeckled extreme apical part of the wing is rich olive-brown, with a thin line of bluish metallic scales along the edge of the wing from near costa to the tornal spot. Cilia dark olive-brown, dotted with white scales. Hind wings white, with tip and edges dark fuscous; cilia dark fuscous, with an indistinct whitish line parallel with the edge of the wing. Abdomen dark fuscous above, each joint tipped with lighter ochreous and silvery scales. Underside of body and legs profusely sprinkled with white scales; spurs white; tarsi annulated with ochreous white.

Alar expanse, 9.5-10 mm.

Las Vegas, New Mexico (Schaus).

Type.—No. 9888, U. S. National Museum.

Nearest *Choreutis occidentella* Dyar and very similar in ornamentation, differing in the smaller size, in the absence of the indistinct whitish fascia at basal third, and in the white hind wings. I have specimens of this species from Jalapa, Mexico, and from Mr. Schaus's collection. It gives me pleasure to dedicate this species to Mr. William Schaus, whose extensive collections of American Microlepidoptera, so liberally donated to the U. S. National Museum, will be subjects for study for a long time to come.

Pliniaca, n. gen.

Antennæ one-half times as long as the fore wings. Upper and anterior sides covered with scales, underside with a short pubescence; basal joint with pecten. Labial palpi short, ascending; second joint shortly tufted beneath; terminal joint pointed. Maxillary palpi obsolete. Tongue very long. Head roughened, face with loosely appressed scales. Fore wings three times as long as wide, obtusely pointed; 12 veins, all separate; vein 7 to termen; 2 and 3 distant; 3, 4, and 5 approximate; secondary cell bearing veins 8, 9, and 10; internal vein to between 6 and 7. 1 b furcate at base; membrane at costal edge between veins 9 and 12

thickened. Hind wings elongate-ovate, as wide as the fore wings; 8 veins, all separate; vein 2 distant from 3, which is omitted at corner of cell; veins 3, 4, 5, and 6 nearly equidistant, parallel; internal vein with one fork above 4 and one above 6. Posterior tibiæ smooth.

Type: P. bakerella Busck.

The genus is not far removed from *Eucalantica* Busck.

***Pliniaca bakerella*, n. sp.**

Antennæ yellowish fuscous. Palpi, face, head, and thorax reddish ochreous, sprinkled with straw-yellow. Fore wings straw-yellow, suffused and streaked with reddish ochreous; the reddish color is aggregated along the basal half of costa, in a broad ill-defined longitudinal streak on the disc and along the dorsal edge; the outer third of the wing beyond the cell is irregularly and sparsely suffused with the same color. Cilia light straw-yellow. Hind wings dark fuscous. Abdomen and legs dark fuscous, sprinkled with straw-yellow.

Alar expanse, 19 mm.

Claremont, Cal. (C. F. Baker).

Type.—No. 9889, U. S. National Museum.

Named in honor of the collector, Mr. C. F. Baker, of the Estacion Agronomica, Santiago de las Vegas, Cuba, who has sent me this and the following species, besides several other interesting Microlepidoptera.

***Pliniaca sparsisquamella*, n. sp.**

Entire insect except the hind wings chalky white. Fore wings with large loosely attached scales; when at all rubbed the yellow skin of the wing gives the species the appearance of being oily. Hind wings rather dark fuscous. Legs and body immaculate white.

Alar expanse, 16-17 mm.

Claremont, Cal. (C. F. Baker).

Type.—No. 9890, U. S. National Museum.

This insect reminds one, in general habitus, of the genus *Tegeticula* Zeller [*Pronuba* Riley, nec Thomson].

Family GELECHIIDÆ.

***Paltodora pennella*, n. sp.**

Antennæ white, with sharp, black annulations. Labial palpi pure white, brush on second joint with a few black hairs interspersed. Face, head, and thorax pure white. Fore wings light ochreous, with the extreme costal edge and a narrow longitudinal streak on the fold white. From apical fifth of costa runs a faint oblique white streak across the

wing to termen; on the middle of the fold is a short longitudinal black streak, above this in the cell is a larger longitudinal streak, and at the end of the cell is a third very short black streak or dot. A few single black scales are sprinkled over the apical half of the wing along costal and dorsal edge. Cilia pure white, with base, tip, and two transverse lines black. Hind wing light ochreous fuscous. Abdomen ochreous. Anterior legs white, with a longitudinal black line through their entire length; posterior legs pure white, tarsi shaded with ochreous and with each joint tipped with black.

Alar expanse, 15 mm.

Bright Angel, Ariz. (H. S. Barber).

Type.—No. 9891, U. S. National Museum.

The species is closest to *Paltodora magnella* Busck, but smaller, brighter ochreous in color, and without the costo-apical white dashes. The peculiar ornamentation of the fore legs makes easy the distinction of this species from all described American species of the genus except *dietriella* Busck, which has a similar ornamentation not mentioned in the description. The wing color and markings, however, separate it from this rather dark ochreous species.

***Sophronia primella*, n. sp.**

Antennæ shining dark brown, without color annulations. Labial palpi whitish, mottled with ochreous fuscous, especially on the exterior side and in the large well-developed brush. Face whitish. Head and thorax whitish ochreous, strongly mottled with dark ochreous and fuscous scales. Fore wings ochreous, mottled and longitudinally streaked with white, black, and fuscous. Costal edge from base to apical third white, edged below by a narrow streak strongly mottled with fuscous. Below it is a nearly unmottled area of clear ochreous, reaching to the middle of the wing and only transversed by a single dark line on the subcostal vein. From base through the center of the wing run close beside each other two parallel black lines, interrupted at the end of the cell by a round brown dot, but continued on the other side nearly to a small round black dot at apex. The dorsal part of the wing is rather freely dusted with white and brown scales and on the middle of the fold is an oblong brown dot. Cilia long, white, with two dark lines parallel with the edge of the wing and with a long thin deep black pencil at apex, which is slightly falcate. Hind wings light ochreous fuscous; cilia light ochreous. Abdomen dark fuscous. Legs ochreous, tarsi annulated with black.

Alar expanse, 17 mm.

Arizona, Colorado, Texas(?).

Type.—No. 9892, U. S. National Museum.

This is the first record in America of this interesting European genus. I have been unable to examine the type of the genus *Illustrella* Hübner, but presume that the other species placed with it in this genus by Rebel are truly congeneric, and the present American species has the same general habitus and the identical oral and venational characters as these. The venation is as follows: Fore wings, 12 veins, 7 and 8 stalked to costa, rest separate; hind wings, 8 veins, 3 and 4 closely approximate or connate (in *primera* approximate), 5 nearest 4, 6 and 7 stalked.

I have long had the type of this species, but have been in doubt about its locality label, which reads: "From Boll, Texas." Such labels were placed, during a short period, on Microlepidoptera from any locality by a young inexperienced worker in the Department of Agriculture and are consequently not dependable. Some European specimens, for example, bear such a label. I have, however, examined and determined specimens from Cochise County, Ariz., and from Denver, Colo., for my friend, Doctor W. G. Dietz, and have thus at least two good localities for the species.

I have met with another species of this genus, collected in New Jersey, but have not sufficient material to properly describe it at present.

***Telphusa velatella*, n. sp.**

Antennæ silvery white, with black annulations. Second joint of labial palpi white, speckled and barred with black; terminal joint white, with two ill-defined black annulations, one around the middle and one just before the tip; brush short, divided. Face iridescent white. Head and thorax white, sprinkled with dark fuscous scales. Fore wings clothed with very long, narrow speckled scales; ground color white, heavily overlaid with ochreous and fuscous on the basal two thirds of the wing; the apical third is also sprinkled with dark scales, but to a less extent and appears quite light contrasted with the basal part. Near base is an oblique, outwardly directed, black costal streak, reaching the fold and followed by a white space only slightly sprinkled with dark scales. There are two longitudinal rows of tufts of raised scales, one through the middle of the wing with the first tuft at basal third, the second on the middle of the wing, and the third at the end of the cell; the other row with two tufts below the fold and the third just below the end of the cell. Hind wings light fuscous. Legs white, barred with black; tarsi black, each joint tipped with white.

Alar expanse, 14 mm.

Williams, Ariz., July (H. S. Barber).

Type.—No. 9893, U. S. National Museum.

Intermediate in coloration between *Telphusa basifasciella* Zeller and *T. belangerella* Chambers, but distinguished from both by the presence of the tufts of raised scales.

***Gelechia triangulella*, n. sp.**

Antennæ purplish fuscous, with black annulations. Second joint of labial palpi iridescent roseate white, sparsely dusted with dark fuscous especially on the brush, which is short and divided, longest at base and tapering towards apex; terminal joint blackish fuscous. Face pale fuscous, strongly iridescent. Head and thorax dark fuscous. Fore wings with light fuscous ground color heavily overlaid with dark fuscous scales, and with a roseate tinge. On the middle of the cell is a blackish triangular spot with one point touching the fold and preceded basally by a few ochreous scales; at the end of the cell is a similar blackish triangular spot; the edges of both spots are faintly continued to the costal edge. Apical third of the wing heavily overlaid with blackish scales. Cilia roseate, sprinkled with black scales. Hind wings light silvery fuscous; veins 6 and 7 nearly parallel, veins 3 and 4 short-stalked. Abdomen ochreous-fuscous. Legs ochreous, mottled on their outer sides with black scales.

Alar expanse, 12–13 mm.

Bright Angel and Williams, Ariz., June and July (H. S. Barber).

Type.—No. 9894, U. S. National Museum.

This is a rather inconspicuous dark species, not very near to any described American species, but probably most easily placed with the few other roseate species, from which it is easily separated by the two large triangular discal markings.

One specimen bears Mr. Barber's label, "common in rats' nest."

***Gelechia kincaidella*, n. sp.**

Antennæ unicolor, dark fuscous. Labial palpi light ochreous, with base of second joint brown and with outer side and tip of apical joint slightly shaded with brown; brush on second joint well developed, but not divided, largest at base, gradually shorter towards apex. Face whitish ochreous. Head and thorax whitish-ochreous, patagia dark brown. Fore wings light ochreous, with a slight tendency toward reddish in the apical part. Costal base, a large semicircular costal spot before the middle of the wing, and a large discal spot at the end of the cell dark brown, with the light ground color as narrow channels between the spots. The large brown spot at the end of the cell is

irregularly pentagonal, with the longest and sharpest point towards apex and with the upper corner touching the costal edge. The apical and terminal edges of the wing are strongly dusted with black and brown scales. Hind wings dark fuscous. Abdomen and legs ochreous. Venation typical.

Alar expanse, 23 mm.

Rock Spring, Wyo. (T. Kincaid).

Type.—No. 9895, U. S. National Museum.

This large handsome species is most nearly allied to *Gelechia paulella* and *G. aristella*, but not mistakable for either. It gives me pleasure to dedicate it to the collector.

***Paralechia californica*, n. sp.**

Antennæ white, with narrow black annulations. Labial palpi silvery white; second joint with a small black dot exteriorly; terminal joint with a black annulation near base and one near the apex; brush well developed, pure white. Face and head silvery white. Thorax white, tipped posteriorly with black. Fore wings silvery white, with extreme base of costa black and with three ochreous oblique costal streaks edged with black, one of which is rather indistinct near the base, another on the middle of the wing more pronounced, and one at apical third; these streaks terminate at about the middle of the wing, except the last, which runs across the wing. There are six conspicuous tufts of raised black scales in two longitudinal rows on the middle of the wing. Dorsal part of the wing pure white, apical overlaid with ochreous and black scales; the interval between it and the last costal streak appears as a narrow angulated white fascia. Hind wings light fuscous, cilia yellowish. Abdomen and legs white; tarsal joints annulated with black.

Alar expanse, 15 mm.

Los Angeles, Cal. (D. W. Coquillett).

Type.—No. 9896, U. S. National Museum.

A striking species, which reminds one of *Mompha eloisella* Clemens, but which can not be confused with any described American gelechiid.

***Trichotaphe barnesiella*, n. sp.**

Antennæ purplish black, shortly ciliated. Second joint of labial palpi dark purplish fuscous, terminal joint ochreous. Head blackish brown, with purplish reflections; face somewhat lighter, iridescent. Thorax blackish brown, patagia light creamy yellow. Fore wings with costal half light creamy yellow in striking contrast to the dorsal half, which is purplish brown; the two colors are sharply divided in the middle of the wing; the yellow costal part which reaches nearly but not quite

to apex has two slight serrations projecting into the dark dorsal part. Cilia blackish. Hind wings dark fuscous. Abdomen dark fuscous, in the female with protruding hairy horny ovipositor. Legs black exteriorly, ochreous on the inner side.

Alar expanse, 17 mm.

Redington, Ariz.

Type.—No. 9897, U. S. National Museum. Cotypes in Dr. Wm. Barnes's collection.

Named in honor of Dr. Wm. Barnes, of Decatur, Ill., to whom I am under obligations for this and many other interesting Microlepidoptera. This striking species is very similar to *Trichotaphe serrativitella* Zeller and has nearly the identical pattern and coloration of the fore wings, but it is at once distinguished from this eastern species by its dark head and palpi.

Family STENOMIDÆ.

Stenoma mistrella, n. sp.

Antennæ in the male strongly ciliate, in the female simple; dark purplish fuscous. Labial palpi long, recurved, smooth, light ochreous gray; underside of second joint slightly thickened with somewhat darker scales. Face, head, and thorax light ochreous gray. Fore wings light ochreous minutely speckled and overlaid with darker brown scales; at the end of the cell is a small but conspicuous round black dot; cilia light ochreous; the costal edge is nearly straight and apex is pointed; venation typical with 12 separate veins, 7 to termen. Hind wings with 8 veins, 6 and 7 stalked, 3 and 4 connate, 5 approximate to 4; dark fuscous. Abdomen dark fuscous. Anterior legs blackish in front; legs otherwise smoky ochreous.

Alar expanse, 20–23 mm.

St. Louis, Mo. Described from five specimens collected by Mr. H. McEhlose and by the writer in September, 1904.

Type.—No. 10708, U. S. National Museum.

The present genus and *Brachyloma*, Clemens (Ide, Chambers) do not belong to the family Xyloryctidæ as tentatively placed in Doctor Dyar's Catalogue, but form a separate family to which Mr. Meyrick has given the name Stenomidæ. This family is the predominating one among the Microlepidoptera of South America.

Family CECOPHORIDÆ.

Ethmia macelhosiella, n. sp.

Antennæ blackish brown. Second joint of labial palpi black, with white base; terminal joint white, mottled posteriorly with black scales.

Face black. Head white, with a black dot on vertex. Thorax white, with black longitudinal central line. Patagia white, with black bases and tips. Fore wings white, more or less overlaid with fuscous; from base to apex is a deep black longitudinal central streak; the costal part of the wing above this streak is somewhat darker than the dorsal part. The streak is interrupted, though not entirely broken, at the end of the cell by a pure white dash and it is edged dorsally from base to beyond the middle by a narrow longitudinal interrupted line of bright orange scales. A few black scales are scattered over the light portion of the wing and tend in the apical part to form narrow longitudinal streaks. Along the dorsal edge is a row of black dots before the cilia, which are white. Hind wings light fuscous. Abdomen dark fuscous. Legs black with white annulations.

Alar expanse, 27 mm.

St. Louis, Mo. (H. A. McElhose).

Type.—No. 9898, U. S. National Museum.

Named in honor of the collector, my friend, Mr. H. A. McElhose, who has sent me this and other interesting Microlepidoptera. The species is nearest *Ethmia subcærulea* Walsingham, but at once distinguished from this and all described American species of the genus by the prominent central longitudinal black streak.

***Ethmia umbrimarginella*, n. sp.**

Antennæ deep purplish black. Labial palpi black; rather more weakly developed than is typical of the genus and with long spreading brush of thin black hairs on the second joint. Tongue coiled, black. Face, head, and thorax deep black. Fore wings dark mouse-gray, with white costal edge and a central longitudinal streak of bright reddish orange from base to near the end of the cell. At the end of the cell is a large oblong deep black spot divided in the middle by a transverse, bright orange dash. On the middle of the wing just above the longitudinal orange streak is a small round deep black dot and preceding it below the orange streak is a larger round black dot. Between this last dot and the base of the wing is a short longitudinal black streak edging the orange. Cilia gray. Hind wings chalky white, with a broad dark gray border all around the edge, cilia gray. Abdomen blackish brown. Legs unicolor dark brown.

Alar expanse, 20 mm.

Las Cruces, New Mexico (T. D. A. Cockerell). Professor Cockerell informs me that the species was taken February 22 on canaigre (*Rumex hymenosepalus*) in Mesilla Park.

Type.—No. 9899, U. S. National Museum.

This and the following species belong to the group of the genus *Ethmia* which is represented by the European *pyrausta* Pallas. The species of this group, which probably should be given generic rank, differ from the typical species of *Ethmia* in the scantier, more hair-like scaling and in the somewhat shorter and weaker labial palpi, which are not smooth as in the typical forms, but covered with a more or less strongly developed brush of thin hairs on the under side of second joint.

None of the hitherto described American species belongs in this group. The present species is nearest the European *auriflua* Hübner, but differs in the unicolored abdomen and in the presence of the orange ornamentation of the fore wings. This and the following species are at once distinguished from all American and European species by their striking white, dark-bordered hind wings.

***Ethmia coquillettella*, n. sp.**

Antennæ purplish black. Labial palpi black, with base of both joints white; second joint with short rough brush beneath. Lower part of face and the region below the eyes white; vertex black. Thorax dark brown; tips of patagia white. Fore wings mouse-gray, somewhat lighter than in the preceding species; at base is an inconspicuous light-yellow spot edged exteriorly with black. Just outside it is a longitudinal deep black dot on the fold and on the middle of the fold is another similar dot. On the middle of the wing is a third similar black dot and at the end of the cell is a fourth somewhat larger black spot, divided in the middle by a large round white or very pale yellow dot. Cilia concolorous with the wing. Under side of fore wing dark gray, with the white second discal spot prominently shining through. Hind wings clear pearly white, with a broad dark gray border on apical and tornal edges but not on costa nor on the base of the dorsal edge. Abdomen above dark fuscous, with bright ochreous anal segment; under side with each joint tipped with white. Legs black, sprinkled with silvery-white scales; tarsal joints tipped with white.

Alar expanse, 15 mm.

Los Angeles, Cal. (D. W. Coquillett).

Type.—No. 9900, U. S. National Museum.

This species is nearest to the foregoing, but much smaller and differs otherwise in the shorter brush on the labial palpi, in the absence of the yellow discal streak on the fore wing, by the incomplete dark border on the hind wings, and by the ornamented abdomen and legs. Named in honor of the collector, who has added many interesting species of Microlepidoptera to the Museum collection.

Family ELACHISTIDÆ.

Mompha pecosella, n. sp.

Antennæ dark fuscous, with narrow black annulations. Labial palpi white; second joint thickly sprinkled with black scales, especially on the exterior side; terminal joint with two black annulations, one near base, the other just before apex. Face iridescent, white. Head white, sprinkled with dark fuscous scales. Thorax dark fuscous. Fore wings blackish brown, irregularly and sparsely sprinkled with white scales and indistinctly streaked with lighter brown longitudinal lines. From costal base runs an outwardly oblique ridge of raised scales across the wing; the basal portion of the wing, limited by this ridge, is strongly mottled with white scales; just before the middle of the costa begins another oblique ridge of raised scales, parallel with the first, but not so complete, consisting of small separate tufts, of which the largest is on the fold. Below the end of the cell is a large tuft of raised scales, surrounded by scattered white scales. Hind wings dark fuscous. Abdomen fuscous above, ochreous on the under side. Legs blackish, sprinkled with ochreous.

Alar expanse, 12-13 mm.

Pecos, New Mexico, June (T. D. A. Cockerell).

Type.—No. 9901, U. S. National Museum.

This species is quite close to *Mompha murtfeldtella* Chambers, but it is smaller and the basal part of the fore wings is mottled, not pure white as in *murtfeldtella*; the light colored thorax also distinguishes that species from the present. With wings folded this insect looks like a *Recurvaria*.

Mompha iridella, n. sp.

Antennæ dark brown, with indistinct silvery white annulations. Labial palpi white, terminal joint shaded in front and at apex with golden fuscous. Head and face white. Thorax fuscous, iridescent. Fore wings light golden brown, overlaid with iridescent white and blue scales. A triangular spot near base of costa, another on the middle of costa, and a third larger costal spot between the latter and apex silvery white; the two last costal spots are edged exteriorly with blackish scales. Between the fold and the dorsal edge are two or three small tufts of erect iridescent scales; similar small tufts are found on the middle of the wing and one at the end of the cell; just below the latter is a larger dark brown iridescent scale tuft. Tip of apical cilia white, cilia otherwise light yellowish fuscous. Hind wings dark bronzy fuscous, cilia a shade lighter. Abdomen bronzy fuscous. Legs whitish, barred exteriorly with fuscous.

Alar expanse, 13-14 mm.

Claremont, Cal. (C. F. Baker).

Type.—No. 9902, U. S. National Museum.

This is a brilliant little moth of iridescent golden and silvery scales, nearest to *Mompha sexnotella* Chambers. Venation and oral characters typical.

Family TINEIDÆ.

Marmara opuntiella, n. sp.

Face and head silvery white. Antennæ fuscous. Labial palpi white, with apex of second joint and a ring around terminal joint black. Maxillary palpi yellowish. Thorax and fore wings yellowish fuscous mottled with black; at basal third of fore wing is a narrow straight transverse white fascia, edged basally with black; at the middle of the wing is a similar slightly oblique white fascia and at apical third are a costal and an opposite dorsal white spot nearly reaching each other; just before apex is a white costal spot. Hind wings dark fuscous. Abdomen fuscous, with ochreous anal appendages. Legs white, with black annulations.

Alar expanse, 7-8 mm.

Southern Texas. Foodplant, *Opuntia* sp.

Type.—No. 9903, U. S. National Museum.

Bred by Mr. E. S. G. Titus in the Insectary of the U. S. Department of Agriculture from an *Opuntia* received during the winter of 1904-5. The larva mines just under the epidermis, making a long winding serpentine mine sometimes widened out into irregular blotches. The larva, like those of the other species of the genus, is footless, much flattened and incised between the joints while in the mine. At the last larval molt it assumes the cylindrical form with normal legs and spins the characteristic cocoon with the peculiar globular ornamentations, as do the other species of the genus.

Ectoedemia, n. gen.

Head and face tufted. Antennæ 3, simple in both sexes, rather thick; basal joint concave and dilated to form a small, strongly scaled eye-cap. Labial palpi well developed, porrected. Maxillary palpi long, folded. Tongue obsolete. Fore wings elongate-ovate, pointed, thickly clothed with scales; 8 veins, veins 3, 4, 5, and 9 absent; cell very short, closed; 6 to termen; 7 and 8 stalked to costa, with stalk out of 6; 1b simple at base. Hind wings nearly as long and $\frac{3}{4}$ as wide as fore wings, elongate-ovate, pointed; 5 veins, veins 3, 4, and 5 absent; cell open between 2 and 6; 6 and 7 stalked from basal fourth of the wing, diverging widely, one running along costal and one along dorsal edge

of the wing and approaching each other at apex; vein 2 simple; vein 1c perceptible. Posterior tibiae clothed with stiff hairs above; middle spurs near but below middle of tibia.

The genus is very close to *Nepticula* Zeller, but that homogeneous genus of leaf-mining moths will not allow the gall-making *populella* within its limits. The main structural differences which separate *Ectoedemia* are the smaller eye-cap, the somewhat more strongly developed labial palpi, the closed cell in the fore wings, and the spurs on the posterior tibiae—which are situated near but below the middle. I am pleased that my views coincide with those of Dr. Edw. Meyrick, to whom I showed specimens while at his home in Marlborough.

Type: E. populella, n. sp.

***Ectoedemia populella*, n. sp.**

Antennae dark cupreous brown, basal joint forming a small eye-cap enlarged by heavy light yellow scaling. Face and head reddish ochreous. Thorax dark brown. Fore wings unicolorous shining dark cupreous brown, with strong green and violet iridescence according to the light. Hind wings lighter cupreous brown, with ochreous cilia. Abdomen shining dark fuscous. Legs ochreous-fuscous with a bluish metallic sheen.

Alar expanse, 7–8.5 mm.

Massachusetts; New Hampshire. Food plant, *Populus*.

Type.—No. 9904, U. S. National Museum.

Described from a very large series of moths bred in the insectary of the U. S. Department of Agriculture from galls on the petiole of leaves of poplar received in September, 1884, from Miss C. H. Clarke, Jamaica Plains, Mass., and from A. Koebele at Holderness, N. H. The following are extracts from Mr. Theo. Pergande's notes on the species:

Each gall contains a single larva, which when mature is 8 mm. long and pale yellow, with pale brown head, mandibles darker, and posterior margin of anal shield brown. Legs only rudimentary and can be entirely withdrawn from view.

The gall is almost globular, of about the size of a pea, and is a swelling of the petiole close to the leaf; it is somewhat rugose longitudinally and of a grayish color. The course of the petiole is generally very distinct along its upper side, being smooth and of a reddish-brown or yellowish color. The cavity is more or less irregular on account of the woody fibers, which run through the walls of the gall and which are not eaten by the larva. Late in October the larvæ left

the galls and descended about $\frac{1}{4}$ inch into the ground in the cage, where they spun small brown, flat, oval cocoons, resembling in shape very much those of the *Nepticula* on apple. The moths issued during May of the following year.

***Neolophus punctellus*, n. sp.**

Antennæ simple in both sexes, thick, with closely set whorls of short scales which give an appearance of serration; ochreous gray. Labial palpi in the males long, slightly recurved, reaching vertex, closely appressed to the face; in the females much shorter, porrected, terminal joint deflected. The palpi are slightly lighter than the head and thorax, which are covered with light fuscous white-tipped scales; thorax smooth. Fore wings appear pearly, light, whitish fuscous, irregularly and sparsely dotted with black scales; under a lens it is seen that the scales are of different shades of brown, each tipped with very light, nearly white, slate-color, except the few deep black ones, which are slightly metallic. Cilia blackish brown. Venation normal, with 12 veins, 7 to termen just below apex, 8 and 9 stalked, 1b furcate at base. Hind wings ochreous brown, with 8 veins, all separate; 3, 4, 5, 6, and 7 nearly equidistant and parallel from the end of the cell; a forked discal vein to vein 4 and to just below vein 6. Abdomen dark fuscous above. Under side of body whitish. Legs whitish, sprinkled with fuscous; tarsal joints dark brown, tipped with white.

Alar expanse, ♂, 19 mm.; ♀, 24 mm.

Hot Springs, Ariz., (E. A. Schwarz); Las Cruces, New Mexico (T. D. A. Cockerell).

Type.—No. 9905, U. S. National Museum.

A pretty species, which can not be confounded with any other American anaphorid, and is easily recognized by the pearly-black dusted fore wings.

—Doctor Hopkins remarked on the genera and species of beetles in this country, particularly in the West, which are very closely allied or identical to European forms.

—Doctor Hopkins reported, also, on the work of the buprestid beetle *Agrilus bilineatus* Web. in oak defoliated by the gipsy moth (*Porthetria dispar* L.), in Massachusetts.

—Mr. Knab presented some notes on the habits of the larva of *Sayomyia punctipennis* Say, a dipterous insect of the family Corethridæ, allied to the mosquitoes. In the discussion which followed, remarks were made on the habits of the larvæ of

Sayomyia by Messrs. Currie and Busck and on those of Megarhinus, a culicid, by Doctor Hopkins.

—The concluding paper was by Mr. Heidemann and entitled "A Preliminary Account of New North American Tingitidæ." Several new species of these "lace bugs" were described and interesting notes presented on the habits of some of them. Many of the forms were exhibited before the Society, with specimens of leaves showing their manner of oviposition.

JUNE 7, 1906.

The 206th regular meeting was held at the Sængerbund Hall, 314 C street, N. W., the Society being there entertained by Mr. E. A. Schwarz. In the absence of the president and both vice-presidents the meeting was called to order by the treasurer, Mr. Patten, and Mr. Schwarz was elected president pro tem. The following persons were present: Messrs. Ashmead, Barber, Barrett, Busck, Condit, Currie, Davis, Heidemann, Knab, Lawford, Morris, Schwarz, Stiles, and Ulke, members, and Messrs. Douglas H. Clemons and William G. Dietz, visitors. The minutes of the April and May meetings were read and approved and reports were presented by the treasurer and by the publication and executive committees.

Dr. A. Fenyes, of Pasadena, Cal., and Mr. F. H. Mosher, of New Bedford, Mass., were elected corresponding members.

By vote of the Society Doctor Howard was requested to act as a delegate from the Entomological Society of Washington to the meeting of entomologists to be held at Ithaca, N. Y.—in connection with the summer meeting of the American Association for the Advancement of Science—for the purpose of organizing a society of American entomologists.

The chairman referred to the overwhelming disaster that had fallen upon the city of San Francisco from the earthquake and resulting fire and spoke of the almost complete losses of books and specimens sustained by the California Academy of Sciences and by Mr. Charles Fuchs, the custodian of the insect collections of that institution. It was thereupon moved and seconded that the Society aid in the restoration of the library of the California Academy of Sciences and of the personal library of Mr. Fuchs

by donating to each a complete set of the Proceedings of the Entomological Society of Washington. These sets, the chairman stated, would be forwarded free of expense to the Society by the Smithsonian Institution.

Doctor Ashmead exhibited the worker of a curious ant collected by Mr. O. F. Cook in Guatemala, *Strumigenys mandibularis* Smith, a cryptocerine. Little is known of the habits of these small ants, but some of them live in galleries in twigs and it is not improbable that they are fungi feeders. Mr. Schwarz stated that the species of *Strumigenys* found in Guatemala lives among old leaves on the ground and that the twig-inhabiting species belong to the genus *Cryptocerus*. One species of *Strumigenys* occurs near Washington, in the vicinity of Bladensburg, Md., among old leaves and in very small colonies, some 5 or 6 individuals only being found together. They may be collected by sifting.

—Doctor Stiles reported the occurrence of the tick *Derma-centor nitens* Neumann in this country. Mr. Hunter recently sent to Washington specimens from Texas. This species has heretofore been reported from Porto Rico and South America. It occurs on horses. Mr. Schwarz remarked that if this species were native to Porto Rico or the West Indies it must have had some other host than horses originally, since the horse is not native there. He asked Doctor Stiles whether this tick had been found on any other animal, and Doctor Stiles replied that it had not. Doctor Stiles stated further that while a single species of ticks might be taken on several different species of animals, yet in the well studied forms it would appear that there is a decided predilection for some one host species. Mr. Schwarz stated that a man-attacking species of tick was very common in Alta Vera Paz, Guatemala, and Doctor Stiles then said that this was in all probability *Ornithodoros megnini* Dugès.

—Mr. Barber reported having captured a specimen of *Mantispa brunnea* Say, a neuropteroid insect, at Jacksons Island, in the Potomac River not far below Great Falls, Maryland. Although this species is recorded from New Jersey and Philadelphia as well as from the Southern States, in its eastern range,

it has never before been taken, judging from the absence of confirmatory records, in the vicinity of Washington. When he first observed it in flight Mr. Barber mistook it for a wasp of the genus *Polistes*. The specimen was exhibited.

—Mr. Barber showed also a specimen of *Flebotomus*, new species, a small fly belonging to the family Psychodidæ, from Guatemala, where he found it extremely annoying from its bite, which was quite severe. According to Mr. Coquillett this genus has not before been reported except from southern Europe and Africa. Mr. Barrett said he believed he had seen the same fly in the southern part of the State of Vera Cruz, in Mexico, where it was known as "chaquista." If this were the same insect he could testify to the severity of its bite.

—Mr. Knab spoke of the paper published by Doctor Dyar and himself on the classification of the Culicidæ by larval characters.* The paper had been adversely criticized, particularly because a number of new species were based solely upon larval characters. While this proceeding might cause temporary inconvenience to systematists it nevertheless seemed to the authors the only method of expressing the great importance of the larval characters, not only in the separation of species otherwise hardly distinguishable, but above all in putting the classification upon a more natural basis. Systematic workers on the Culicidæ have wholly neglected the study of the early stages and have based their classification largely upon superficial and unimportant characters. Many of the genera are unnatural and often composite, formed of species brought together upon superficial resemblance but in no wise related. Doctor Dyar's work upon the early stages of the Lepidoptera and its influence upon the classification of that order is so well known that similar work of his in other groups is bound to command respect. Under the circumstances the following post-card, received from Baron von Osten Sacken by Doctor Dyar, is of interest as coming from a man who can see beyond the inevitable shortcomings.

*The larvæ of Culicidæ classified as independent organisms. By Harrison G. Dyar and Frederick Knab. Journ. N. Y. Ent. Soc., Vol. xiv, pp. 169-230, Plates iv-xvi, 1906. (Separates issued March 15, 1906.)

HEIDELBERG, GERMANY, May 4, 1906.

My Dear Sir: I had the pleasure to receive your paper, "The larvæ of Culicidæ classified as independent organisms." When I first began the study of N. Am. Diptera, in 1856, I never dreamed that within half a century this study would reach a degree of progress and perfection as your paper shows it to be the case!

Very sincerely yours,

C. R. O. S.

Mr. Knab then requested Doctor Stiles to state the ruling adopted by the International Zoological Congress with reference to species based upon larval characters.

In reply Doctor Stiles said that there were two standpoints from which to look at this question. The first was that of nomenclature and from this standpoint he thought the practice of describing species from other than the adult forms was perfectly allowable. Numerous species in different groups of the animal kingdom have been described from some immature stage and the descriptions and names under which they were published have since been recognized as valid. From the standpoint of classification the question was, however, one of feasibility. In many cases the descriptions of immature stages are of great value. As an instance, the descriptions of the eggs of cestodes and nematodes are very important in clinical diagnoses, and clinical determinations are in these groups made on the egg nine times out of ten.

Mr. Morris said that it was customary among botanists, especially among students of fungi, to recognize the earliest name given to a plant regardless of what stage formed the basis of the description; and in publications these names were followed by Roman numerals to indicate which stage was described.

Mr. Schwarz alluded to the recognition of descriptions of the work of insects, as galls, etc. He asked Doctor Stiles whether species based on the description of the structure and form of the excrement should be considered valid. Doctor Stiles replied that fossils described on the structure of the excreta or of prints were accepted and he saw no reason why the same rule should not apply to other animals.

—Mr. Schwarz presented an informal paper entitled "Notes on Guatemala." He stated, by way of introduction, that Mr. Barber and he had recently returned from a short trip to Guatemala for the U. S. Department of Agriculture, most of their time being spent in the province of Alta Vera Paz. Guatemala has been more written about than any other Central American country. Doctor Sapper spent twelve or thirteen years in Alta Vera Paz and has written a most interesting book concerning the region. The entire country made up of British Honduras, Costa Rica, Yucatan, and Panama is one solid tropical forest. The plateau region of Guatemala, of which Alta Vera Paz is a part, is drier than the country of the lower levels and bears some resemblance to the plateau regions of Mexico and the United States. One peculiarity of Guatemala, however, is that the mountain ranges run from east to west. There are three of these ranges, of which the southernmost is the highest. Some of the peaks are 12,000 or 13,000 feet high and have never been scaled.

Regarding cotton raising in Alta Vera Paz and the cotton-protecting ant or kelep (*Ectatomma tuberculatum* Oliv.) Mr. Schwarz stated that there was no wild cotton plant in that country, but some remarkable varieties of cotton are cultivated there which need no protection whatever from the cotton boll weevil (*Anthonomus grandis* Boh.). In Guatemala cotton is grown continuously and there is no intermittent season as in the United States. The arborescent cotton found there is not native and it reproduces throughout the year as do the other forms of cotton. On this arborescent cotton the boll weevils multiply and it is this cotton which needs protection from these insects. In regard to the kelep colonies, some of them are insectivorous and others not. Those which are insectivorous will eat any insect which occurs on the cotton, and do not confine themselves to boll weevils.

The amount of rainfall in Guatemala is astonishing, and this accounts largely for the immense forests. There is a scarcity of roads and clearings and this makes collecting difficult, as it is almost impossible to penetrate the tropical jungle.

Large numbers of brilliant butterflies are to be seen in the

clearings, but other insects must be searched for, and to secure them great labor is required. The diurnal Lepidoptera from that country are well known; the Heterocera, on the other hand, are very rarely seen and appear to be very scarce. The families of Coleoptera which are well represented are the Chrysomelidæ, the Cerambycidæ, and the Curculionidæ. Of these, the Chrysomelidæ are conspicuous and very numerous, both in species and individuals. The Cerambycidæ, although well represented, are not conspicuous and must be searched for. The Curculionidæ, also, are not obvious, but are nevertheless well represented. There appear to be no large bright colored Diptera. Some Tipulidæ mimic hymenopterous parasites and are quite conspicuous. Man-attacking Diptera are very abundant, and are represented by black flies (*Simulium*), sand flies, mosquitoes, Tabanidæ, Hippelates, and the psychodid *Flebotomus* exhibited earlier in the meeting by Mr. Barber. Antidotes and repellents are not of much account against them, and the latter are soon dissipated in the open air. On the whole Mr. Schwarz thought that the Diptera were not well represented as regards number and variety of species. Forficulidæ were abundant and in great variety, as were also the roaches and crickets in the Orthoptera, and the katyids. Strangely enough they found not a single native dytiscid beetle. Dragonflies and other insects belonging to the neuropteroid orders were poorly represented. There was a remarkable absence of fleas, though the sand flea (*Sarcopsylla*) occurred on the sand of the coast at Puerto Barrios; no bed bugs were seen or heard of, and Mr. Schwarz stated that the driver ants (*Eciton*) constituted a capital enemy of all household insects.

In conclusion Mr. Schwarz exhibited a collection of photographs of Guatemala scenery taken on the trip by Mr. Barber.

OCTOBER 4, 1906.

The 207th regular meeting was held at the Sængerbund Hall, 314 C street, N. W. President Banks occupied the chair and there were present Messrs. Barber, Banks, Busck, Caudell,

Currie, Dyar, Gill, Hopkins, Knab, Patten, Piper, Quaintance, Schwarz, Stiles, and Ulke, members, and Messrs. Marcus Benjamin, C. E. Burden, and C. H. T. Townsend, visitors.

Mr. Knab exhibited a number of photomicrographs of scales from the wings of adult mosquitoes of different species, some of the latter belonging to supposedly different genera. He pointed out how unsatisfactory and inadequate is a classification of genera based on these scale characters and mentioned some of the errors which have been made by attempting to characterize genera from these scales alone, without reference to the larvæ. As an example, *Mansonia fascipes* Coq. and *Pneumaculex signifer* Coq. have larvæ which appear identical, yet have adults which can not be associated by scale characters. The genus *Grabhamia* of Theobald is a composite genus made up of unrelated species which happen to have similar scales. Other instances of this kind were mentioned.

—Mr. Schwarz spoke of the importance of correctly-designated type localities as an aid in the identification of species the descriptions of which are inadequate. He then referred to the difficulty he had experienced in designating intelligibly the localities in which he had made collections with Mr. Barber the past spring in the province of Alta Vera Paz, Guatemala, where settlements are few and many of these consist merely of a few temporary structures, and are not found on the map and have no permanent standing. In cases of this kind good photographs of the localities where collections have been made are often of considerable value, as they show the character of the locality, its topography, etc., which mere names of settlements do not. Mr. Barber took a number of such photographs, many of which are so characteristic that if seen they would be recognized by any one who had visited the localities. One of these, exhibited by Mr. Schwarz, was of the hamlet of Cacao (fig. 5), located at the foot of the cliff of the Thirteen Waterfalls (Trece Aguas) at an altitude of about 900 feet above sea level. This locality presents a most remarkable topographic feature which probably has not its like anywhere else. Mr. Caudell then called attention to the fact that Morse, in a recent paper on Acrididæ, had published photographs of some

of his type localities, and Mr. Piper stated that he knew of other similar instances.

—Mr. Quaintance exhibited a microscopic slide of an *Aleyrodes* apparently identical with *A. citri* R. & H., and coming from China. It was collected on orange, and this, in his opin-



FIG. 5.—Cacao and the Trece Aguas Cliff in Alta Vera Paz, Guatemala.

ion, gave additional evidence to support Prof. Cockerell's suggestion that *A. citri*, the destructive orange white fly of Florida, is native to China and came originally from there.

Another proof lies in the fact that the insect freely infests the "China tree" (*Melia azederach*) and also the Cape Jessamine (*Gardenia jasminoides*), the former, at least, being native to China.

—Mr. Banks exhibited a box of conopid flies taken within five miles of Falls Church, Va., and remarked on their great resemblance to wasps. Thirteen species had been taken, as follows:

Physocephala tibialis Say. Common.

Physocephala sagittaria Say. Less common.

Conops xanthopareus Will. Common.

Conops sylvosus Will. Local.

Conops brachyrhynchus Macq. Fairly common.

Zodion fulvifrons Say. Common.

Zodion abitus Adams. Four specimens at Ceanothus.

Myopa vesiculosa Say. A few specimens.

Myopa pilosa Will. Two specimens.

Oncomyia loraria Loew. Rather rare.

Oncomyia abbreviata Loew. Common.

Dalmania vitiosa Coq. One specimen at Ceanothus flowers.

Stylogaster neglectus Will. Many specimens, mostly near Ceanothus flowers.

Practically all of our species, Mr. Banks stated, favor white flowers, but a few occur at willow bloom in early spring.

—Mr. Banks recorded also the capture of an uncommon dragon-fly, *Neurocordulia obsoleta* Say, near the Chain Bridge, Virginia, last spring. The species had not previously been taken in this vicinity.

—Doctor Dyar, under the title "Notes on Mosquitoes of California," read a paper in which he gave an account of mosquitoes, mostly from the coast region, collected during the past summer. The most extensive collections were made in the vicinity of Los Angeles. On this trip Doctor Dyar collected also along the Southern Pacific Railway between San Francisco and Portland and on the Northern Pacific between Portland and Vancouver, also making a side trip to the Klamath Lake region of southwestern Oregon, and species collected in these regions were alluded to incidentally.

In discussing the paper Mr. Schwarz spoke of the change in

the character of the country in much of the arid portion of southern California, brought about through irrigation. This, naturally, has resulted in a change in the character of the mosquito fauna and an introduction of new forms. There are portions of California, however, where it will probably never be possible to irrigate, and where therefore no faunal changes of this character will occur. Mr. Schwarz mentioned the fact that the western part of the San Joaquin valley contains several faunal regions which well deserve an investigation as regards the mosquitoes and other insects inhabiting them. Mr. Currie then spoke of having collected and reared, among other species, *Culex tarsalis*, *Culex incidens*, and *Anopheles punctipennis* and *maculipennis* at Portland, Oregon, during the season of 1905. *Anopheles punctipennis* was the common *Anopheles* in the places where his collections were made, namely, near the Lewis and Clark Exposition grounds.

—The concluding paper was by Doctor Hopkins, and entitled "Statistical Taxonomy." What was meant by this term was explained by Doctor Hopkins and illustrated by a chart in which the statistical method was applied to bark weevils of the genus *Pissodes*. By a comparison of micrometer measurements of the length of the beak to the length of the thorax and the length of the elytra in a number of individuals of each species, a mathematical formula was obtained which would express the structural proportions of that particular species. Then, by comparing the formulas of different species the relative position of each species in the genus or group would be obtained. This was illustrated in a chart of the species of *Pissodes* in which the application of this method divides them into what Doctor Hopkins believed to be natural groups. Doctor Hopkins explained in conclusion that this method was used by him as a guide to a natural arrangement of species, but not as a means for their determination and as merely secondary to other characters. He called attention to the progressive development of the beak in *Rhynchophora*, from the *Scolytidæ*, which have a non-rostrate head, to the species of *Balaninus* in the *Curculionidæ*, which have extremely long beaks. This elongation of the beak was not, he believed, brought about through use or as a result of

specialized food habits requiring a long beak, but was merely the following out of a dominant tendency to modification along this line without any apparent necessity therefor; in other words, it may not be an adaptive character. Mr. Schwarz asked Doctor Hopkins whether he considered the *Brenthidæ* and *Anthribidæ* as belonging to the *Rhynchophora*. Doctor Hopkins replied that he was uncertain as to the position of the *Brenthidæ*, but the *Anthribidæ* certainly did not belong to the *Rhynchophora*.

NOVEMBER 1, 1906.

The 208th regular meeting was held at the Sængerbund Hall, 314 C street, N. W. President Banks presided and the following persons were present: Messrs. Banks, Barrett, Busck, Currie, Dyar, Heidemann, Hopkins, Knab, Morris, Patten, Quaintance, Sasscer, Schwarz, Ulke, and Webster, members, and Messrs. C. N. Ainslie and David E. Lantz, visitors. The minutes of the October meeting were read and approved. The Treasurer presented a brief report. The Executive Committee reported that they had elected Mr. E. A. Schwarz as Editor and Dr. Harrison G. Dyar as Assistant Editor. At a later meeting they had decided that the election of these editors was not to change the status nor functions of the Publication Committee holding office at the present time.

Prof. E. F. Hitchings, State entomologist, Waterville, Maine, and Rev. James Hansen, St. John's University, Collegeville, Minn., were elected to corresponding membership.

Mr. Quaintance exhibited some masses of larval cocoons of the codling moth (*Carpocapsa pomonella* L.), taken from the floor of an apple storage room in southeastern Nebraska. He stated that the cracks in the boards of the floor were infested with thousands of these cocoons made by the hibernating larvæ. This illustrated in a striking manner the importance of screening the buildings in which apples are stored, so that the moths emerging in the spring can not escape to the orchards.

—Mr. Busck exhibited two California species of the tortricid genus *Hendecaneura* Walsingham. This genus was erected

on three Japanese species and had not hitherto been recorded from this continent. The males of this genus are remarkable through having only 11 veins in the fore wings instead of the usual 12 as found also in the females, the stalked veins 7 and 8 having become coincident in the males. One American genus, *Amorbia* Clemens, and two Australian genera defined by Mr. E. Meyrick—all three containing but few species—were the only other tortricids known to him that exhibited a similar reduction in the number of veins in the fore wing.

Mr. Busck said that his studies in this family had led him to believe that this and other secondary sexual characters, notably the costal fold, could not be relied on as of generic value and that genera which were based on such characters alone would prove to be artificial. The present genus as well as *Amorbia*, however, seemed to be well defined on other peculiarities in the venation, common to both sexes, but other genera, such as *Eucosma*, *Lipoptycha*, and several others, would have to be re-arranged in order to bring about a natural system.

Mr. Busck stated that at present the costal fold on the fore wings of the males was relied upon as one of the primary characters in separating the genera in this family. This, aside from the resulting unnatural grouping, was a constant inconvenience, as by it only the males could be classified.

Doctor Dyar said he believed that the initiative taken by Mr. Busck in the tortricids would have to be followed in other groups of Lepidoptera by the rejection of genera based solely or mainly on secondary sexual characters. Mr. Schwarz pointed out that the more remotely a secondary sexual character is situated from the true characters, the less value it has in classification.

Doctor Hopkins said that his study of the secondary sexual characters in the Scolytidæ and Pissodes indicated that without a detailed knowledge of such characters as represented in allied species and genera their interpretation and use as generic and specific characters would lead to much confusion in the future, as it had in the past. Certain characters, such as the more elongate and slender beak and the seven visible dorsal segments in the female curculionid, might be important family and even

superfamily characters; while, on the other hand, certain frontal and elytral declivity characters in the Scolytidæ might be reversed completely in the same genus and in allied genera. It was evident, however, that secondary sexual characters were of great taxonomic value when thoroughly studied and properly interpreted. It would appear that the primary sexual characters of the reproductive organs, while showing striking specific differences in some particulars, often have constant characters in general structure throughout the genus, while certain lines of modification would serve to indicate primary and minor divisions and their natural position in the classification. It should be remembered that in both secondary and primary characters similar body structure and similar stages of evolutionary development might bring about similar characters in very different species, genera, and families.

—Mr. Schwarz showed a beautiful cluster of microgaster cocoons from Cacao, Trece Aguas, in Alta Vera Paz, Guatemala. They were remarkably fine in texture so that the cocoons in the mass could not be distinguished. The mass when found was covered with ants of the genus *Monomorium*, and the larva of which the microgaster was a parasite could not be identified. The mass was afterward placed in a breeding cage and about 200 parasites emerged. These were submitted for examination to Doctor Howard, who pronounced them not the microgaster, nor even a secondary, but a tertiary parasite.

—Doctor Hopkins exhibited specimens of the scolytid beetle *Pagiocerus rimosus* Eichh. and of its work in fruit of the red bay (*Persea barbonia*) and in the pulp and seeds of custard apple (*Anona glabra* and *Anona cherimolia*), and presented the following note:

**A GENUS AND SPECIES OF SCOLYTIDÆ HERETOFORE
UNRECORDED FROM THE UNITED STATES.**

By A. D. HOPKINS.

In April, 1905, the Bureau of Entomology of the U. S. Department of Agriculture received specimens of *Pagiocerus rimosus* Eichh. from Prof. A. L. Herrera, the entomologist of

the Mexican Government, with the statement that they were destroying the pulp and seeds of custard apple (*Anona glabra* and *A. cherimolia*) in Yautepec, Morelos, Mexico. The specimens of the fruit sent with the insects showed the burrows of the beetles in the pulp and seed. The walls of the burrows are apparently covered with a white substance resembling an ambrosia fungus.

In April, 1906, Mr. H. Pittier, of the Bureau of Plant Industry of the U. S. Department of Agriculture, sent specimens of the same beetle from Cauca, Colombia, South America, with a statement that they were found injuring corn, but he failed to send specimens of the work or to describe its character.

On October 4, 1906, the Bureau of Entomology received specimens of the same species from Mr. G. L. Fawcett, of the Bureau of Plant Industry, with numerous injured fruits of the red bay (*Persea barbonia*), found at Miami, Fla. Mr. Fawcett suggested that the insect might prove to be injurious to the avocado or alligator pear, which also belongs to the genus *Persea*. Each fruit shows a single entrance through the thin pulp and seed, and the inner portion of the seed was partially or completely destroyed when received, but no evidence of the immature stages was found. Therefore it may be that the injury was due to a food habit of the adult, and that the broods may develop in stems of graminaceous or herbaceous plants, like corn, cane, palm, etc.

Apparently this is the first record of the food habits of the beetle and also the first record of a representative of the genus *Pagiocerus* in the United States.

Blandford^a states that this species appears to be common and widely distributed in tropical America. Eichhoff^b described it from specimens received from Cuba. Chapuis^c records it from Colombia, Chile, Brazil, and Cuba. In addition, Blandford records it from Mexico, many localities in Guatemala, and one locality in Panama.

The only other described species of the genus is *P. cribricollis* Eichh. from Brazil.

The genus *Pagiocerus* comes near to *Cnesinus*, which is represented in North America by *C. strigicollis* Lec., and is widely distributed in the Eastern and Southern United States, and extends into Mexico. This species has been found by Mr. Schwarz boring in the wood of sweet gum (*Liquidambar*) and the writer has found it in stems of the large smilax or green-

^a Biol. C.-Am., Coleoptera, Vol. iv, pt. 6.

^b Berl. Ent. Zeitschr., 1868, p. 148.

^c Syn. Scol., 1869, p. 26.

briar and a correspondent reports finding it in apple branches in West Virginia. Mr. Fiske found it at Tryon, N. C., boring in the pith of hickory twigs, and at New Landing, S. C., abundant in the stems of smilax. It appears that the larva has not been observed, therefore the breeding habits of this species are uncertain.

Doctor Hopkins showed also specimens of the *Cnesinus* mentioned in the preceding note, and drawings of structural details of the *Cnesinus*, the *Pagiocerus*, and the hickory bark-beetle (*Scolytus quadrispinosus* Say).

—Mr. Schwarz reported that he found adults and larvæ of the cabbage butterfly (*Pontia rapæ* L.) present in hundreds at Trece Aguas, Alta Vera Paz, Guatemala, last spring. This butterfly does not seem to have been recorded from Guatemala and it was an interesting subject for conjecture how it reached this rather inaccessible part of the country. Very little vegetable produce comes to Guatemala from the United States, most of it being imported from Germany, and it would seem that the latter country must prove to be the source of the infestation. Mr. Schwarz described the exceedingly mountainous character of the country in Guatemala.

—Mr. Quaintance asked the opinion of the members as to the function of the cornicles or nectaries of the Aphididæ. He stated that David Sharp, in the portion of the Cambridge Natural History treating of insects, says that although it was formerly supposed that the honey dew is excreted from the nectaries it is now known that this is not the case, but that this substance is excreted from the anus. Mr. Quaintance stated that he had himself observed globules exuding from the nectaries of the cabbage aphid (*A. brassicæ* L.), the apple aphid (*Aphis mali* Fab.), and the red goldenrod aphid (*Siphonophora rudbeckiæ* Fitch). Mr. Pergande, too, had informed him that he had often seen globules of liquid exuding from the nectaries of aphides of many species—not only from those having external tubes but also from those in which the place of the tubes is taken by two simple openings or pores—and in making balsam mounts of aphides from life he had seen drops of fluid exuding

from the tubes and pores and other drops about to exude. Mr. Pergande also informed him that in the case of those gall-making aphides in which no tubes or corresponding pores have been discovered he had noticed drops of liquid in the galls which must have come from the anus.

The matter was discussed by several of the members present and the consensus of opinion was to the effect that while liquid is excreted from the anus yet it is excreted also from the nectaries, and many of the members stated that they had observed the fluid coming from the nectaries.

—Mr. Knab exhibited the volume for the year 1760 of the French journal "Memoires de Mathematique et de Physique," and called attention to an article published therein describing the copulation of mosquitoes. The observations there recorded were made by the commanding officer of a ship in passage from India around the Cape of Good Hope, and from the description of the act it was now possible to recognize the species involved as *Stegomyia calopus*. The copulation was observed after the vessel had been on its way some months and had rounded the Cape, and after storms, indicating that the mosquitoes were breeding on the vessel. The act took place in flight, but there was no swarm and the sexes faced each other and clasped each other with their claws. This agreed with what is now known of the habits of *Stegomyia*. Mr. Knab stated that the mosquitoes recorded in this article as very abundant on board the vessel early in the voyage were probably not *Stegomyia* but *Culex*, and these no doubt perished, while those seen abundantly later, and whose copulation was observed, were *Stegomyia* and were undoubtedly bred on board the vessel. Mr. Knab pointed out that there are two styles of copulation among mosquitoes and these are correlated with the structure of the claws of the female; the mosquitoes which copulate as described for *Stegomyia* have toothed claws in the female, while those in which there is a swarm of males into which the female flies and where the sexes are joined end to end and facing in opposite directions, in the fashion of the *Tipulidæ* or crane-flies, have simple claws in the female. This character of the toothed or simple claws is not one which has any importance in classi-

fication. Mr. Schwarz related instances of the carriage and breeding of *Stegomyia* on board ship.

—Mr. Banks recorded the capture at Glencarlyn, Va., of the rare syrphid fly *Mixogaster breviventris* Kahl. The species was described from Kansas.

—Mr. Schwarz mentioned as an interesting fact that the collection of large tenebrionid beetles of the genus *Eleodes* sent from the National Museum to Dr. F. E. Blaisdell of San Francisco was entirely uninjured by the earthquake, and the specimens were so returned to the National Museum. Although the shock threw the boxes all together in a heap yet not a tarsus was lost. Doctor Dyar stated that the collection of *Lycænidae* of the National Museum sent for study to Mr. Fordyce Grinnell, Jr., Palo Alto, Cal., was also uninjured by the earthquake.

—Mr. Schwarz presented a paper on the coleopterous fauna of Alta Vera Paz, Guatemala. He stated that this portion of Guatemala had been explored by Godman & Salvin for the *Biologia Centrali-Americana* and later by Champion, the latter spending four years there. He and Mr. Barber made collections in that region last spring while on a mission for the U. S. Department of Agriculture. Large Coleoptera did not appear to be abundant. About 1,200 species of the order were collected by them in that restricted locality alone. The insect collections which they made at the coast town of Livingston were of quite a different character from those made at Cacao in Alta Vera Paz and from those described in the *Biologia*, and resemble specimens recorded from British Honduras.

Mr. Knab remarked that in the tropics the dung beetles of the genus *Onthophagus* are often seen resting on the leaves. Mr. Schwarz stated that *Limnichus* in the *Byrrhidae* and *Pæderus* and certain other staphylinids, which live on the ground along river banks in the United States, live in trees in Guatemala, the necessary moisture for them being found there.

Mr. Schwarz stated that he and Mr. Barber were under great obligations to Mr. O. F. Cook and Mr. F. L. Lewton, of the Bureau of Plant Industry, for procuring for them with great labor the flowers of some palms in which many fine insects were found.

—Mr. Banks presented the following paper :

DESCRIPTIONS OF NEW TRICHOPTERA.

By NATHAN BANKS.

(Plates VIII, IX.)

The following pages contain descriptions of thirty new caddice-flies from the United States, a generic synopsis of the family Sericostomatidæ, and an arrangement of the species of the genus *Neuronia*. Several new genera in the Limnephilidæ are described; these will be tabulated in a future paper on the classification of this family. The whole is preliminary to a catalogue of the Neuropteroid insects of Boreal America, to be published in a short time.

***Phryganea californica*, n. sp.**

Head yellowish brown, with white hair; thorax blackish, with white hair and black bristles; a tuft of black bristles at base of fore wings; the white hair forms a broad median stripe on the thorax; abdomen brown, banded with yellowish or whitish above; legs pale yellowish, with only a very few pale yellowish spines on the tibiæ, anterior tibiæ rather infuscated at tips. Wings uniformly blackish fumose, densely clothed with long black and white hair intermixed, darkest along the basal venation; an elongate white spot on the thyridium before fork, a white dot in base of third apical cell, the cross-vein at base of the fourth apical cell, and the lower part of the arculus hyaline. Both wings very narrow and almost acute at tips, the outer edge in fore pair being straight, not convex, a distinct cross-vein between costa and subcosta near pterostigma; discal cell plainly shorter than its pedicel; first apical sector arising from about middle of cell; the apical cells long and narrow; the arculus straight. In the hind wings the discal cell is very short, not one-third the length of the second apical cell, fifth apical cell very short pedicellate; no cross-vein from radial sector to radius.

Expanse, 33 mm.

One female from California (no definite locality).

***Neuronia inornata*, n. sp. (Pl. IX, fig. 20).**

Head and thorax yellow-brown, abdomen dark brown; maxillary palpi and antennæ yellowish brown; head and thorax with gray hair; legs dull, pale yellowish; both pairs of wings soiled, whitish hyaline; faint indications of brown irrorations near veins of anal area of fore wings; pterostigma rather darkened; venation pale brownish, a dark dot in base of third apical cell. Wings rather broad, sparingly clothed

with short black hair. In fore wings the first apical sector arises before the middle of discal cell, the latter scarcely as long as its pedicel and narrowed at tip; the radius downcurved and then upcurved before the pterostigma; arculus nearly straight, not angulate at end of cubitus, but the branch from median is angulate to meet the arculus. In hind wings there is a cross-vein from discal cell to radius, and the first sector arises from the middle of this cross-vein; the discal cell is very short, the third apical cell narrowed at base. The tibiae of legs have only a few short black spines; those on the hind tibiae not more than one-half the diameter of the joint.

Expanse, 38 mm.

One specimen from St. Anthony Park, Minn. (Pettit).

Neuronia canadensis, n. sp.

Head black; face with erect golden hair; posterior warts rufous, bearing rufous hair; palpi pale; antennae reddish brown; lobes of prothorax yellowish, and with long yellowish hair; thorax black, lateral lobes pale, and the scutellum rufous, with golden hair; legs yellowish, with golden hair and black spines, femora blackish on bases; abdomen black. Wings yellowish, fore pair densely irrorate with brown, a larger spot before and after pterostigma, and at ends of veins, and at arculus; venation brown; membrane finely granulate, and with sparse golden hair. Hind wings yellowish hyaline, a brown spot before pterostigma, and beyond a few brown irrorations, and dark at ends of veins. Fore wings broad, broadly rounded at tip; discal cell about three-fourths as long as pedicel; first apical cell as long on discal as width of latter, fifth not extending back as far; the arculus angulate; cross-vein from median to cubitus ends beyond forking of latter vein.

Expanse, 28 mm.

One specimen from Guelph, Ontario, Canada (Jones). Differs from nearly all others by fork 1 arising beyond middle of discal cell; from *stygipes* and *pardalis* by pale hind wings; from *lapponica* and *dossuaria* by broader, more densely irrorate wings, and curved arculus.

Genus NEURONIA Leach.

ARRANGEMENT OF SPECIES.

1. First apical sector arising at or before middle of discal cell.....2
 First apical sector arising beyond middle of discal cell.....4
2. Arculus plainly angulate at end of cubitus; wings more or less yellowish, and marmorate with brown [*ocellifera*, *semifasciata*, *postica*, and *augustipennis*].
 Arculus nearly straight3

3. Fore wings marmorate with dark brown.....*concatenata*.
 Fore wings almost unicolorous.....*inornata*
4. Hind wings black on basal part; feet black.....5
 Hind wings pale on basal part; feet pale.....6
5. Second subapical cell with base longer than of the third..*pardalis*
 Second subapical cell with base not longer than that of the third.
stygipes.
6. Wings white, with few black band-like reticulations; arculus straight;
 wings narrower*dossuaria*.
 Wings yellowish, with many brown markings; arculus curved;
 wings broader*canadensis*.

Anabolia montana, n. sp.

Head dark brown; antennæ paler brown, narrowly annulate with darker; palpi yellowish; thorax brown, with a jet black stripe on each side of mesothorax, narrowly bordered with white internally. Legs yellowish; tips of tarsi and tip and middle of anterior tibiæ outside blackish; spines black. Fore wings dark brown, anal field darker than elsewhere, and costal rather pale, sprinkled with many fine, pale dots, much more numerous in apical part, a larger, pale oblique mark on the thyridium, and one smaller at arculus, also some spots along the outer margin; a pale geminate spot in base of the third apical cell; pterostigma slightly darker than rest of wing. Hind wings hyaline, darker near the pterostigma, and a dot in base of third apical cell. Venation very similar to *A. bimaculata*, but the fifth apical cell is scarcely as acute at base, and the discal cell a little shorter than in that species; the hind wing is less excised below the apex than in *A. bimaculata*.

Expanse, 30 mm.

Four specimens from Franconia, Mt. Washington, N. H., and Mt. Katahdin, Maine.

Halesochila, n. gen.

Last joint of hind tarsi without spines beneath; the pterostigma thickened and very prominent; first apical cell broad at base, membrane of wing not granulate; spurs 1-3-3; mesothoracic strips short and with few bristles; fork 3 present in hind wings.

Type: Halesus taylori Banks.

This genus is near *Chilostigma*, but differs in smooth membrane of wings, and in the spur formula.

Allophylax, n. gen.

Last joint of hind tarsi without spines beneath; pterostigma not thickened nor prominent; mesothoracic strips short, not nearly one-

half the length of mesothorax; fork 3 present in hind wings; spurs 1-3-4; first apical cell reaching back on discal cell more than the width of latter; wings very broad.

Type: Stenophylax punctatissimus Walker.

Differs from *Stenophylax* in great length of the first apical cell.

***Stenophylax minusculus*, n. sp. (Pl. IX, fig. 12).**

Head black, yellowish hairs on the vertex, gray on the face; palpi blackish; antennæ brown, basal joint black; thorax and abdomen black, tip of latter brown, yellowish hair on prothorax and mesothorax; legs pale yellowish, femora black, except at extreme tips, last joint of tarsi brown, spines black. Fore wings hyaline, largely marked with brown; venation brown; apical cells mostly hyaline, subapicals mostly brown, anal area brown, costal area pale, middle area of wing brown, extending out above to the brown pterostigma, a pale spot in apex of discal cell, a longer spot in apex of thyridial and median cells; the arculus, and a dot on thyridium before fork white-hyaline; hind wings hyaline, venation pale. Fore wings rather narrow, discal cell slightly longer than its pedicel, radius bent near pterostigma, cubitus disjointed at posterior anastomosis. In the hind wings the discal cell is plainly shorter than its pedicel; the third apical cell is widened at base, and has a dark dot; the fourth is narrowed at base, and the fifth reaches quite a little before it.

Expanse, 18 mm.

One specimen from Olympia, Washington (Kincaid).

***Parachiona signata*, n. sp.**

Head and antennæ yellowish brown, palpi paler; vertex with yellowish bristles from the warts; large yellow bristles from pronotum; thorax and abdomen yellow-brown, darker on tip of latter; legs pale yellowish, spines black. Fore wings yellowish brown, darker along median vein and in anal area, paler in costal area, venation pale brownish, outer anastomosis dark brown, and margined with brown, a large hyaline spot on the thyridium, and a pale dot in base of third apical cell; hind wings hyaline, venation pale. Head rather short and transverse, no macrochæta behind ocelli; basal joint of antennæ large and long. In the fore wings the discal cell is about equal to its pedicel, the fifth apical cell not reaching before fourth; the cubitus not disjointed at the posterior anastomosis, radius bent near pterostigma. In hind wings the discal cell is shorter than its pedicel, the fourth apical cell has an oblique base, the fifth not reaching before it.

Expanse, 27 mm.

One specimen from Idaho, July (R. W. Doane).

***Parachiona pilosa*, n. sp. (Pl. IX, fig. 13).**

Black, shining; head with black hair; antennæ dark brown; pronotum with some long golden-yellow hair, lateral lobes in front of the wings are bright yellow, and clothed with golden-yellow hair; abdomen dark brown, a stripe each side paler; legs yellow-brown, darkest on the femora; spurs 1-3-4; a few black spines on the tibiæ. Wings uniform blackish brown, clothed with black hair, a hyaline spot just before the fork of the median vein, and the arculus also hyaline; hind wings rather paler than the front pair, and with brown fringe. Both pairs of wings rather broad, and broadly rounded at the tips; discal cell of fore wings is slightly longer than its pedicel, but not nearly as long as the apical cells, all of which are of equal length, and the fifth acute at base. In the hind wings the first apical does not reach before the cell, and the fourth apical is widened at base. The mesothoracic strips are very short; and the palpi are also very short.

Expanse, 16.5 mm.

One male from Olympia, Washington State, in May (Kincaid).

***Limnephilus osleri*, n. sp. (Pl. IX, fig. 19).**

Dull yellowish, clothed with yellowish hair; spines on the legs black. Fore wings yellowish hyaline, venation pale, an elongate brown cloud in middle of basal part, each side of median vein; a small patch near apex of discal cell, a dark brown spot in thyridial area above posterior anastomosis, and containing a minute pale dot; obliquely backward from this is an irregular dark cloud, mostly between the cubital and median veins, and containing a geminate pale spot; beyond the posterior anastomosis toward the hind margin mostly brown, with many pale spots and dots; apical cells with some indistinct dark spots, most prominent at the outer margin; anal area uniformly pale brown; a dark dot in base of third apical cell. Hind wings hyaline, venation pale yellowish. Maxillary palpi of female with last joint longer than the preceding; ocelli rather small; vertex moderately flat; posterior warts not very large; basal joint of antennæ rather long; vertex with a pair of submedian bristles backward and toward middle from the ocelli; bristle-bearing strips of metathorax elongate and narrow. Fore wings long and narrow, outer margin oblique, almost concave; discal cell very long and slender, but not twice the length of the pedicel, longer than any apical cell; first and fifth apical cells reach about the same distance back of anastomosis; radius very strongly bent at pterostigma; cubitus much disjointed at the anastomosis, so that the third subapical

cell is broad at base. In hind wings the discal cell is about as long as the pedicel, and as long as any apical cell; all apicals broad at base, but the fourth rather narrower than the others; the vein from the posterior anastomosis arises much nearer to the cubitus than to the median, and then curves forward.

Expanse, 44 mm.

One female from South Park, Col., 25 May (Osler); others from Wellington, B. C., and Tabernash, Colo.

***Pycnopsyche similis*, n. sp. (Pl. IX, fig. 25).**

Head and thorax reddish yellow, palpi pale yellowish, antennæ rather reddish yellow; legs pale yellow, with black spines; abdomen pale at base, nearly black at tip; fore wings pale yellowish, outer edge broadly bordered with brown, a brown spot in base of third apical cell, containing a darker dot, another smaller in fifth apical cell, and three discal brown spots forming a discal band like that of *P. guttifer* and *Platyphylax subfasciata*, but not quite as long; a hyaline spot on the thyridium before the fork; venation pale; hind wings hyaline, venation pale. Wings shaped and veined as in *P. guttifer*. No macrochæta back of ocelli, but hairs on the vertex, thoracic strips very short and narrow, with only five or six tubercles in each; spurs 1-3-3.

Expanse, 30 mm.

Two specimens from Agricultural College and Chatham, Mich., August, September.

Very similar to *P. guttifer* (Pl. IX, fig. 22), but distinct by genitalia of male.

***Phryganomyia*, n. gen.**

A limnephilid; no spines on last joint of hind tarsi; fore wings rather slender, apical cells very long and narrow, first not reaching far on discal cell; in hind wings the discal cell is very short, and there is a cross-vein from the first apical sector near its base connecting to the radius; spurs 1-3-4; ocelli very large; no macrochæta back of the ocelli; maxillary palpi short, in the male the basal joint is as long as either of the other joints, a condition very rare in the Limnephilidæ.

Type: Asynarchus alascensis Banks.

The genus *Phryganomyia* includes also the following new species.

***Phryganomyia obscura*, n. sp. (Pl. VIII, fig. 6.).**

Head, antennæ, and palpi yellowish, vertex with yellowish hair, but no macrochæta back of the extremely large ocelli; thorax yellowish,

with whitish hair; abdomen dark brown, appendages pale yellowish; legs pale yellow, with yellowish spines and spurs. Fore wings dull yellowish hyaline, venation pale brown; faint traces of brown irroration on hind part of the wings; hind wings yellowish hyaline, venation pale. Fore wings rather slender, discal cell plainly shorter than pedicel, not nearly as long as the apical cells, first and second apicals both with oblique bases, fifth scarcely reaching before the fourth, cubitus disjointed at posterior anastomosis. In hind wings the discal cell is very short, only about one-third the length of its pedicel, apical cells very long, fifth reaching only a little before fourth.

Expanse, 22 mm.

One specimen from Tupper Lake, Minn. (Pettit).

Ecclisomyia, n. gen.

A limnephilid; no spines on last joint of hind tarsi; spurs 1-2-4; fore wings rather long, the discal cell is very long, and the first apical cell is more than twice the width of discal cell upon the latter; the outer margin is rounded; in the hind wings the fourth apical cell is not narrowed at base. Ocelli large, no macrochæta behind them; the basal joint of antennæ rather longer than usual.

Type: *E. conspersa*, n. sp.

Ecclisomyia conspersa, n. sp. (Pl. IX, fig. 14).

Head reddish yellow, vertex with a triangular black spot enclosing the ocelli, no hairs on the vertex, but black bristles from the warts; antennæ and palpi yellowish; thorax reddish brown, darker on each side; abdomen yellow-brown, darker toward tip above; legs pale yellowish, spines black. Wings pale brown, with scattered, whitish hyaline dots, a larger one on the arcus; the hyaline spot in the third apical cell and that just below the thyridium are geminate with a brown dot; membrane with short black hairs, venation pale brown; hind wings hyaline, venation pale. In the fore wing the discal cell is three times as long as its pedicel, yet barely as long as the third apical cell.

Expanse, 27 mm.

One specimen from Olympia, Wash. Differs from *E. maculosa* in larger size, absence of pale spot on thyridium, larger spot on arcus, etc.

Ecclisomyia maculosa, n. sp. (Pl. IX, fig. 18).

Head reddish yellow, vertex blackish in middle; antennæ and palpi pale yellow, all with yellowish hair; legs pale yellowish, spines black; abdomen brown. Fore wings nearly uniform brownish, with some scat-

tered, rather large hyaline spots, most numerous in apical part; venation very pale. Hind wings hyaline. Head rather more transverse than usual, vertex convex; ocelli large, nearer to median line than to eyes; posterior warts small; antennæ almost crenulate beneath, basal joints not very long; maxillary palpi of female long, last joint a trifle longer than penultimate. Spurs 1-3-4. Costal area of fore wings rather broad; outer margin rounded; radius not bent at pterostigma; discal cell fully twice as long as pedicel, and about as long as any apical cell; first apical cell reaching back on discal nearly one half way; fifth apical but little before anastomosis, acute at base; posterior anastomosis oblique, the cubitus not disjointed at that place. In hind wings the discal cell is longer than pedicel, but not nearly as long as some of the apical cells; first apical some distance on discal cell; fifth not reaching back of anastomosis, acute at base; the second vein beyond the fifth apical cell forms an elongate, closed cell with the next vein, as in figure (so in both hind wings). Margins of wings with rather long fringe.

Expanse, 15 mm.

One female from Boulder, Colo., July 31 (Osler).

Probably related to the *Stenophylax dubius* of Europe, which has a long first apical cell in fore wings.

Notidobia assimilis, n. sp. (Pl. VIII, fig. 8).

Body black, base of abdomen beneath yellowish, appendages yellowish; legs brown, very slender; wings yellowish brown, with sparse gray vestiture, venation brown, mostly indistinct, fringes black; hair on face black, on abdomen pale, but sparse, on appendages black and long; abdomen of male long and slender. Male appendages broad, concave within, a small notch above toward base, outer edge with several long spine-like bristles; on upper inner corner is a recurved tooth within as in the two species from California described by McLachlan; the median piece is large, blunt-pointed, and the tip is seen in side-view; the tip of abdomen, both above and below, bears many long, curved hairs.

Expanse, 19 mm.

Two specimens from San Diego, Cal. (Field).

Brachycentrus similis, n. sp. (Pl. IX, fig. 21).

Head brown, white hairs above; maxillary palpi brown, with gray hairs in front; labial palpi paler; antennæ with basal joints dark brown, beyond paler brown, narrowly annulated with yellow; thorax dark, a broad pale stripe on the middle; abdomen dark brown, with yellowish and whitish hairs; legs yellowish, anterior femora blackish, others barely so. Wings smoky, darker on costal region near tip, a few faint

traces of pale spots on margin between the veins. Hind wings paler gray, with gray fringe. Venation as in the other species. The tip of male abdomen has two plates, showing from above a median emargination between them, in this differing from all our other species.

Expanse, ♂, 20 mm.; ♀, 25 mm.

A male from Tabernash, Colo., August (Tucker) and female from Boulder, Colo., August 9, at light (Cockerell).

***Lepidostoma stigma*, n. sp. (Pl. VIII, fig. 10).**

Head brown; palpi yellowish; basal joints of antennæ brown, as long as width of head, beyond yellowish, with narrow brown annuli; thorax dark brown, four warts on pronotum; coxæ dark brown, rest of legs pale yellowish, with white hair, spurs pale; abdomen dark brown above, pale beneath; wings dull brownish, with scattered black hairs; in both pairs a broad streak of dark brown over the posterior fifth of radius, extending up to subcosta and nearly reaching radial sector; venation as figured; anal margin of hind wings with long cilia.

Expanse, 18 mm.

One female from Colorado (Oslar), and two from Boulder, Colo., Aug. 9 (Cockerell), at light.

***Thremma deceptiva*, n. sp. (Pl. VIII, fig. 1).**

Head brown; vertex shining; a distinct ocellus over each antenna and between bases; basal joint of antennæ yellow-brown, scarcely as long as distance from eye to eye, beyond yellowish, narrowly annulate with brown; palpi yellow, in female upturned; thorax brown; legs pale yellowish, spurs 1-3-4; abdomen large, venter and sides pale, dorsum light brown; wings nearly hyaline; venation brown, a large elongate dark spot in stigmal region of both pairs, and a minute dot in base of third apical cell.

Expanse, 15 mm.

One female from Beulah, New Mexico, 8,000 feet (Cockerell).

Differs from the type of the genus in longer wings and longer discal cell and fork 3, and in that in the hind wings fork 1 is present.

***Helicopsyche arizonensis*, n. sp.**

Head clothed with gray hair, palpi and basal joints of the antennæ with brown hair, rest of antennæ pale yellow, narrowly annulate with brown; thorax black, with some yellowish and gray hair; abdomen brown, darker above than below, legs yellowish, brownish on the basal

half of femora and apical parts of hind tibiae, tarsi pale, faintly marked with dark at extreme tip of joints. Wings of a uniform brown, without marks, but seen to have many short golden hairs, fringe dark brown, hind wings dark gray, with a longer, blackish fringe. Fore wings rather long (longer than in *H. borealis*), hind wings much shorter, and acute at tips; the middle tibiae have beneath a row of about twenty-five short, but stout, black spines.

Length, 8 mm.

Three examples from Nogales, Ariz. (Osler), in July. Differs from *H. borealis* and *H. californicus* by annulate antennae.

Family SERICOSTOMATIDÆ.

TABULAR VIEW OF THE GENERA.

1. A cross-vein connecting radius to radial sector near discal cell....2
No such cross-vein present.....4
2. The cross-vein above discal cell; five apical cells in fore wings.
Notidobia.
The cross-vein is beyond discal cell; seven apical cells in fore wings.3
3. In hind wings only one pedicellate apical cell, seventh apical broadly truncate at base; joints 2 and 3 of maxillary palpi barely longer than joint 4.....~~*Namamyia*~~.
In hind wings two pedicellate apical cells (5 and 7); maxillary palpi with joints 2 and 3 plainly longer than 4.....~~*Norophitus*~~.
4. Discal cell in hind wings closed; basal joints of antennae long, and densely hairy; spurs 1(2)-4-4 or 1-3-4.....5
Discal cell of hind wings open.....11
5. Ocelli present; spurs 1-3-4.....*Thremma*.
No ocelli; four spurs on middle tibiae.....6
6. Discal cell in fore wings much longer than pedicel; a small cell on posterior margin of fore wing beyond middle; male with maxillary palpi small, erect, appressed; no scales on hind wings.
Notiopsyche.
Discal cell in fore wings not, or barely, longer than pedicel.....7
7. Discal cell about as long as pedicel; in hind wings first apical cell scarcely extends back of second; male with anal vein of fore wings running into margin, and not connected near tip to cubitus.8
Discal cell plainly shorter than pedicel; male without scales on hind wings, neither labial palpi nor tarsi 1 enlarged; the connection between median and cubitus beyond middle of wing.....9
8. Male with labial palpi and first joint of tarsus 1 much enlarged (female unknown)*Nosopus*.
Male without such parts enlarged; scales on hind wings; female

- with basal joints of antennæ very long.....*Lepidostoma*.
9. Anal vein apparently running straight into branch of cubitus, really connected to cubitus by a cross-vein sloping backward.....10
 Anal vein running into margin, or in female connected to branch of cubitus by a cross-vein; male with costal margin broadly recurved over wing*Olemira*.
10. In fore wing a longitudinal vein between anal and cubitus for some distance; four apical cells in hind wings; cubitus of fore wings with one fork; male maxillary palpi heavily hirsute, porrect.
Atomyia.
 In fore wing no such vein between anal and cubitus; three apical cells (or really two) in hind wings; cubitus of fore wings with two forks; maxillary palpi of male small, slender, upcurved and appressed*Mormomyia*, n. gen. (*Mormonia vernalis* Banks).
11. Spurs 2-2-2; forks 2 and 3 present in fore wings....*Oligoplectrum*.
 Spurs 2-3-3; forks 2 and 3 present in fore wings; antennæ rather widely separated*Brachycentrus*.
 Spurs 2-2-4; forks 2 and 3 absent in fore wings.....*Helicopsyche*.
 Spurs 2-4-4; area interclavialis enlarged at tip.....*Goera*.

***Trienodes frontalis*, n. sp. (Pl. IX, fig. 11).**

Head black, clothed with snow-white hair, a large tuft under each antenna with some black hairs in it; palpi brown, with white hair; antennæ with snow-white hair, and brown annulations at ends of joints; thorax black, with snow-white hair; abdomen yellowish; legs yellowish, with yellowish hair. Fore wings mostly clothed with white and gray hair, some black hair, especially on apical part; a black mark on radius near stigma, one on median near cell, and one at arculus, with black fringe at this point; apical part more or less irrorate with brown or black; hind wings smoky, blackish on tips, fringe gray.

Expanse, 16 mm.

One from Ft. Collins, Colo., 20 June (Baker).

Readily separated from *T. grisea* by black head and snow-white hair.

***Setodes vernalis*, n. sp. (Pl. VIII, fig. 3).**

Pale yellowish; abdomen dull brown, except paler appendages; wings rather dusky, with the radius and cubitus dark brown; hairs on costal region golden, in apical part mostly blackish; forks 1 and 3 of equal length, the first with a pedicel rather longer than the veinlet closing the discal cell; lower branch of radial sector ending at tip of wing. Hind wings rather dusky, scarcely darker on tips, fringe long, and dark gray. Appendages of male as figured; a long, slender, curved piece each side, which, seen from above or below, meets its fellow to form a circle, their inner edges with long fine hairs.

Expanse, 11 mm.

High Island, Maryland (near Washington), 17 June; several specimens.

Setodes autumnalis, n. sp. (Pl. IX, fig. 23).

Pale yellowish throughout, clothed with pale yellowish hair, wings with golden hair; abdomen rather brighter yellow at tip. Wings very slender, both pairs acute at tips, fork 1 with pedicel as long as veinlet closing discal cell, fork 3 no longer than fork 1. In hind wings the radial sector is not distinct on basal portion. Last segment of abdomen of male is very large, upturned, and has a hairy appendage near tip, narrow at base, broad and rounded above.

Expanse, 14 mm.

High Island, Maryland (near Washington) 28 September.
Readily known by pale yellow color.

Setodes grandis, n. sp. (Pl. VIII, fig. 4).

Head and thorax dark brown, clothed with mostly white hair; palpi brown, with brown hair; basal joints of antennæ brown, beyond yellowish, narrowly annulate with brown at tips of joints; legs pale yellowish, first pair darker. Abdomen pale, sometimes darker on tip. Wings dusky, with sparse black hair; radius and cubitus dark brown; hind wings faintly dusky, with gray fringe. Both pairs are long, and acute at tips; fork 3 much longer than fork 1, the latter very short pedicellate; lower branch of radial sector ending slightly before tip of wing.

Expanse, 16 mm.

Three from New Haven, Conn., 23 June (Viereck); also from Falls Church, Va.

Æcetina inornata, n. sp.

Yellowish, clothed with yellow hair; palpi with more gray hair; antennæ narrowly annulate with dark; abdomen and legs entirely pale yellowish. Wings hyaline, densely clothed with golden, and some blackish hair, apical fringe rather long, and brown; anostomoses not marked, the posterior one very oblique; hind wings more hyaline, with sparse blackish hair, and long dark fringe. Maxillary palpi rather heavy, and densely haired. Fore wings with both forks not extending back of discal cell; in hind wings the second fork has a pedicel nearly its length, and the first fork extends only a short distance back on the discal cell.

Expanse, 18 mm.

Douglas, Ariz., August (Snow).

***Æcetina apicalis*, n. sp. (Pl. VIII, fig. 2).**

Yellowish, clothed with yellowish hair; palpi with darker hair; antennæ annulate with black; abdomen pale above, almost black beneath; legs pale yellowish. Wings very sparsely clothed with very fine black and yellow hairs; the anastomoses broadly margined with black, the posterior one running obliquely backward; membrane toward apex is blackish; hind wings more hyaline, with a long black fringe on posterior margin, especially heavy near base. Maxillary palpi heavy, and densely haired. Fore wings nearly acute at apex, both forks barely reaching back of the anastomosis; in hind wings the second fork starts from the discal cell, the first extending back a considerable distance on the cell.

Expanse, 18 mm.

One specimen from Brownsville, Tex., June (Snow).

***Æcetina persimilis*, n. sp.**

In appearance this species is very like unto *Æ. incerta* and *Æ. parvula*, and about intermediate in size, or as large as a small *Æ. incerta*. The wings are clothed with long gray hairs, and the anastomosis is dark brown. It belongs, however, to the other section of the genus; having in the hind wings the cross-vein connecting fork 1 to fork 3; so it is more allied to *Æ. fumosa*. It differs, however, from that species in smaller size, lack of patches of black hair on the wings, and in that the cross-vein closing the discal cell is as long as the next cross-vein beyond it (plainly shorter in *Æ. fumosa*).

Specimens from High Island, Maryland, and from Glen-carlyn, Va., in June.

The genus *Æcetina* differs from the European *Æcetis* (type *ochracea*) in having much narrower hind wings, and in that the cross-vein at end of discal cell of fore-wing is considerably beyond the other cross-veins. The European *Æ. lacustris*, and probably other species, belongs to *Æcetina*. The species of *Æcetina* may be arranged in two sections, according to position of the cross-vein in the hind wings. In one section the cross-vein connects forks 1 and 3, while in the second section the cross-vein ends in the median before the origin of fork 3. The first section includes *Æ. fumosa*, *avara*, *apicalis*, and *persimilis*; the second section contains *incerta*, *flavida*, *guttata*, *floridana*, *inornata*, *parvula*, and *flaveolata*.

***Setodina*, n. gen.**

A leptocerid near *Setodes*, but the last joint of the maxillary palpi is short, although a little curved; the spurs are 0-2-2; forks 1 and 3

are present in the fore wings, 1 and 5 in the hind wings; there is no cross-vein in the hind wings; antennæ much longer than the body, basal joint very large. Based on a tiny insect, no larger than a good-sized hydroptilid, which differs from all other Leptoceridæ in the greatly reduced venation of the hind wings.

Type: The following species.

Setodina parva, n. sp. (Pl. IX, figs. 24, 26).

A uniform dull pale gray; legs and antennæ more yellowish; wings clothed with gray hairs. Fore wings quite slender; the radius and subcosta close together; the discal cell longer than second apical cell; the cross-veins are very faint, but can be seen against a strong light; hind wings with a long fringe behind, no cross-veins present; in the basal part of third apical cell of the fore wings there is a small dark dot. Expanse, 5.5 mm.

Three specimens from Kissimmee, Fla., in November.

Hydropsyche minuscula n. sp. (Pl. VIII, fig. 5).

Dull black, head and thorax clothed with yellowish gray hair, almost golden on vertex, with some black hair each side; antennæ pale, annulate with dark; abdomen blackish above, yellowish below; legs yellowish, with yellow spurs, some longer black hair on hind tibiae. Wings clothed with black and yellowish hair, giving them a uniform grayish or brownish appearance, devoid of markings, except sometimes a little more heavily marked with black on the middle of the hind margin, and sometimes a faint yellowish mark near outer anal angle; fringe blackish, or broken with yellow near outer anal angle; hind wings gray, with gray fringe. Eyes of male widely separated; antennæ rather heavy; fore wings broadly rounded at tips, fork 1 reaching more than one-half way to discal cell; in hind wings fork 1 is absent, and the tip is slightly upturned. Length, 6 mm.

Several specimens from Plummers Island, Maryland, in August.

It falls in Ulmer's genus *Hydropsychodes*, which differs from *Hydropsyche* only in lacking fork 1 to hind wings; *H. analis*, *H. sordida*, *H. gracilis*, and *H. divisa* will also go in this genus, if it be adopted.

Phylocentropus, n. gen.

An hydropsychid near *Holocentropus*; venation as in that genus except that fork 1 in both wings arises from the discal cell; in this

respect like *Wormaldia*. Forks 1, 2, 3, 4, 5 in fore wings; 1, 2, 3, and 5 in hind wings. Fore wings with distinct costal cross-vein; discal cell closed in both pairs of wings; spurs 3-4-4; tibia and metatarsi of middle legs dilated in female; no ocelli.

Type: Holocentropus placidus Banks.

The genus also includes *Polycentropus lucidus* Hagen.

Nyctiophylax Brauer.

This genus includes *Polycentropus vestitus* Hagen and *P. affinis* Banks; and it is probable that *Cyrnus pallidus* Banks and *C. fraternus* Banks also belong here; they have the superior branch of radial sector present in hind wings, but the closure of the discal cell is extremely indistinct, if always really present.

Plectrocnemia australis, n. sp. (Pl. IX, fig. 17).

Face below antennæ deep black, with black hair; palpi black; head above antennæ with much golden hair, but a tuft of long, black hair above each eye; antennæ yellow, faintly annulate with pale brown; thorax with a stripe of yellow hairs in the middle, and black hair on each lateral lobe; abdomen brown; legs rather brownish yellow. Wings brown, thickly spotted with yellow, median vein and anal region darker brown than elsewhere, a patch of longer black hair near base of fore wings, and several black marks along the costa. Hind wings grayish hyaline, darker near tips on costal part. Venation like *P. conspersa*, but fork 1 is not nearly as long as its pedicel; fork 5 is wide-spread at base. The legs are long and slender; on middle tibiæ the submedian spurs are as far from base as the longer spur of the pair; on hind tibiæ the submedian spurs reach scarcely more than one half way to tip; and the apical spurs are hardly one half the length of the first tarsal joint. The tip of female abdomen ends in a slender upcurved ovipositor, widened at tip.

Expanse, 21 mm.

From Jacksonville, Fla. (Mrs. Slosson).

Psychomyia mœsta, n. sp. (Pl. VIII, fig. 9; Pl. IX, fig. 15).

Head and thorax black; vertex with white hair, and some white hair near the tubercled pits on mesonotum; antennæ pale yellowish; palpi brown, with black hair; legs pale yellowish, with large, long spurs, 2, 4, 4, no trace of another on front tibiæ; all legs with many fine yellowish hairs; abdomen brown, appendages yellowish; wings dull brownish, without mark, densely black-haired, but these hairs most prominent along anal field where they are nearly distinct enough to

form a stripe. Fore wings veined as in *Psychomyia*, fork 1 not present; hind wings more excavate on apical half of front margin than any figured species, and fork 3 is not present, thus like *Ecnomus*; fringe on hind edge of hind wings about as long as width of wing; middle tibiae and metatarsi plainly dilated in female.

Expanse, 11 mm.

One female from Colorado (No. 2133), probably Ft. Collins or Denver.

***Rhyacophila torva* Hagen (Pl. IX, fig. 16).**

In the Eastern States there are at least three allied species. I identify as *R. torva* a form with more spotted wings than the others. It has the lower branch of the median vein in fore wings forked before the middle, so that the fork is longer than its pedicel; this fork is not as near base as the fork of the upper branch of the radial sector. The male genitalia show a forked process each side below.

I have specimens from Sherbrooke, Canada; Franconia, N. H., and Sea Cliff, N. Y.

***Rhyacophila terminata*, n. sp. (Pl. VIII, fig. 7).**

In this species the lower branch of the median vein in fore wings is forked much beyond the middle, so that the fork is much shorter than its pedicel, and no longer than the fork of the upper branch. The wings are not very dark, rather sparingly flecked with yellow, and the basal joint of the antennae is much darker than the others. The male genitalia show a pair of very long appendages below.

From Delaware Water Gap, New Jersey. Two females from Ithaca, N. Y. agree in venational characters, but are in poor condition.

***Rhyacophila nigrita*, n. sp.**

Much like *R. torva*; with the fork of lower branch of the median vein before the middle, so that the fork is longer than the pedicel; this fork is as near to the base of wing as the fork of upper branch of the radial sector. Wings a deeper black than in *R. torva*.

Two specimens from the Black Mts., North Carolina, June.

EXPLANATION OF PLATES.

- FIG. 1. *Thremma deceptiva*: wings.
2. *Cetina apicalis*: male genitalia.
3. *Setodes vernalis*: male genitalia.

4. *Setodes grandis*: male genitalia.
5. *Hydropsyche minuscula*: male genitalia.
6. *Phryganomyia obscura*: male genitalia and palp.
7. *Rhyacophila terminata*: male genitalia.
8. *Notidobia assimilis*: male genitalia.
9. *Psychomyia mæsta*: hind wings.
10. *Lepidostoma stigma*: wings.
11. *Trienodes frontalis*: male genitalia.
12. *Stenophylax minusculus*: male genitalia and palp.
13. *Parachiona pilosa*: male genitalia.
14. *Ecclisomyia conspersa*: male genitalia and palp.
15. *Psychomyia mæsta*: female genitalia.
16. *Rhyacophila torva*: male genitalia.
17. *Plectrocnemia australis*: female genitalia.
18. *Ecclisomyia maculosa*: hind wing.
19. *Limnephilus osleri*: female genitalia.
20. *Neuronia inornata*: palp and claspers.
21. *Brachycentrus similis*: male genitalia.
22. *Pycnopsyche guttifer*: male genitalia.
23. *Setodes autumnalis*: male genitalia.
24. *Setodina parva*: head and palp.
25. *Pycnopsyche similis*: male genitalia.
26. *Setodina parva*: wings.

—The following papers were presented for publication.

NOTES ON UNITED STATES ORTHOPTERA, WITH THE DESCRIPTION OF ONE NEW SPECIES.

By A. N. CAUDELL.

In June, 1905, Dr. J. Hornung, of Menlo Park, Cal. sent to the National Museum several specimens of a large black earwig for determination. These proved to be *Chelisoches morio* Fab., an insect hitherto unknown from the United States.* Correspondence with the collector elicited the information that they were taken some miles from Menlo Park in peach trees. They are probably importations from the Hawaiian Islands, where the species is common.

On May 18, 1906, Mr. Douglas Clemons found a single specimen of the small cockroach *Holocompsa nitidulus* Fab., in Washington, D. C. It was crawling on cotton batting from

* In 1900 (Ann. Soc. Ent. Belg., XLIV, p. 51) Burr records it as questionably occurring in North America.

the store room at the National Museum. This handsome little roach is found in the West Indies and Mexico, as well as in Central and South America. The members of the genus are easy of dissemination and are fast becoming cosmopolitan, and one or more species will very surely become permanent residents within our borders.

On October 9, 1905, Mr. J. C. Rounds, of Westwater, Utah, sent a female specimen of *Stagmomantis carolina* L. to the National Museum for determination. This, I believe, is the farthest western specific record for this insect, though some older general localities may include regions even farther west.

The writer has in preparation a catalogue of the Orthoptera of the United States and Canada which is intended for publication as soon as Professor Bruner completes his work on the *Biologia Centrali-Americana*, which includes many species that occur within our borders. The advancement made in the study of this order since the issuance of Scudder's catalogue seems to warrant a new catalogue being made. Certain names in present use that are untenable from one cause or another, usually nomenclatural in nature, will need changing. One such case follows:

Scudder^b describes what he supposed to be the *Caloptenus regalis* of Dodge, placing it in the genus *Æoloplus*. But, as stated by Professor Bruner in a letter to the writer, the *C. regalis* of Dodge is a *Melanoplus* occurring in Nebraska and Colorado, specimens from the latter State sent me by Professor Bruner agreeing with the original description of Dodge. Thus the insect described as an *Æoloplus* by Scudder is, from a nomenclatural standpoint, without a name. The specific name *bruneri* is therefore proposed for it.

***Asemoplus rainierensis*, n. sp.**

Last year Mr. H. E. Burke brought me a pair of a new species of *Asemoplus* from Mt. Rainier, Washington. This year (July, 1906) I visited Mt. Rainier and found the insect present in Paradise Valley in vast numbers. So numerous, indeed, were they that the ground in places was fairly swarming with them, the grass and small plants being wholly destroyed by the myriads of these small grasshoppers. Associated with the new species was an equal number of an apterous species which was described by Walker from Canada as *A. nudus*. Superficially the new species bears a very close resemblance to Walker's species but structurally it is quite distinct. From *Asemoplus montanus* Bruner, however, the new species is less easily sepa-

^b Rev. *Melanop.*, p. 71.

rated. When compared directly with the types of this last species, however, it is seen to be amply distinct. The three species of the genus may be separated as follows:

1. Tegmina present2
 Tegmina absent*nudus* Walker.
2. Cerci of the male about two and one-half times as long as the basal width, reaching the tip of the supra-anal plate and apically curved somewhat downward; pronotal disk of both sexes transversely convex, passing insensibly into the lateral lobes without indication of lateral carinæ*montanus* Bruner.
 Cerci of the male no more than twice as long as the basal width, scarcely attaining the tip of the supra-anal plate and in no way apically decurved; pronotal disk of both sexes transversely less convex above, passing more abruptly into the lateral lobes, forming distinct but rounded lateral carinæ.....*rainierensis*, n. sp.

In coloration *rainierensis* is similar to *montanus*, except that the infuscation on the lateral lobes of the pronotum does not extend so far downwards, making a more distinct lateral stripe. The abdomen above is usually broadly yellow, rarely with a narrow broken dark median line. The frontal costa of the female is more distinctly sulcate than in *montanus*, and the eyes are not so widely separated, the interspace being about three times as broad as the basal segment of the antennæ, while in *montanus* it is about four times as broad. The posterior margin of the pronotum is angularly concave, much more so, especially in the female, than that of either *montanus* or *nudus*.

The measurements of a mature pair chosen as types from a large number of specimens are as follows: Length, antennæ, male and female, 7 mm.; pronotum, male, 3.5 mm., female, 4.5 mm.; posterior femora, male, 9 mm., female, 11 mm.

Type.—No. 10707, U. S. National Museum.

There is little variation in size. The color of living specimens is very different and much brighter than that of specimens preserved either pinned or in spirits, no matter how well prepared by stuffing.

Out of nearly one hundred specimens of both sexes examined, but one specimen was found with either elytron missing, that one a female with the left elytron gone. Professor Scudder states that one half or more of all specimens of *montanus* seen by him had one of the tegmina gone. This is not true, however, of the few specimens of that species seen by me.

A FEW NEW COLEOPTERA OF THE GENUS BITOMA, WITH NOTES ON OTHER COLYDIIDÆ.

By CHAS. SCHAEFFER.

This paper is based largely on the material in the genus *Bitoma* contained in the Hubbard & Schwarz collection of Coleoptera in the U. S. National Museum. Through the kindness of Mr. Schwarz I have been enabled to study this material, and, as will be seen in the following pages, several of the species have proved to be new. Among the material sent me by Mr. Schwarz are two more species which are apparently new, but as I was unable to find a good structural character to separate them from their nearest allies, and as they were represented by single specimens only, I leave these for the future, when more material will be available.

The sculpture of the metasternum of most of our species of *Bitoma* may be called granulose. In some species the granules are distinct, but slightly elongated; in others they are longitudinally confluent, giving the surface a strigose appearance which is especially strongly pronounced in *ornata*, *quadriguttata* and *pinicola*, but in *vittata* more feebly and the granules hardly confluent. In *discolor* the sculpture of the metasternum is feeble, but slightly more distinct than in *prosopis* and *suffusa*.

The sculpture of the elytral intervals in pale specimens looks at first entirely different than in dark specimens of the same species; this is rather misleading, especially as in certain species the sculpture in dark specimens is more difficult to make out clearly than in pale specimens.

TABLE OF THE SPECIES OF BITOMA.

1. Antennæ with ninth joint as wide as the eighth.....2
Antennæ with ninth joint wider than the eighth.....9
2. Semicylindrical, thorax longer than wide, narrowing from apex to base, elytra strongly carinate.....*carinata* LeConte.
Depressed, thorax as wide or wider than long.....3
3. Thorax much narrower at base than at apex; elytral intervals on each side with two rows of tubercles, these two rows separated by a nearly smooth median line; color piceous, each elytron with a longitudinal reddish vitta not extending quite to apex. *vittata*, n. sp.
Thorax not or very feebly narrower at base than at apex.....4
4. Metasternum nearly smooth7
Metasternum longitudinally strigose5
Metasternum finely granulate, the granules at base slightly longitudinally confluent; color piceous, the humeri sometimes slightly paler, thorax strongly transverse.....*quadricollis* Horn.

5. The two lateral thoracic costæ very distinct.....6
 The inner of the two lateral thoracic costæ obsolete at apex, visible at base, but not as sharply as the outer; color piceous, with four scarcely visible reddish spots on each elytron, an oblique one near base, a small rounded spot near side margin at middle, a slightly larger one at apical third, and a small very indefinite spot slightly below this, these spots rarely well defined or absent..*pinicola*, n. sp.
6. Each elytron with one or two reddish spots; an oblique one near base and a round spot at apical third, the latter sometimes absent.
ornata LeConte.
 Each elytron with three or four reddish spots.....*quadriguttata* Say.
7. Elytral intervals on each side with a row of well separated, small, round, perforate punctures, the rows separated from each other by a slightly uneven median line; color testaceous, head, thorax, four elytral spots, and apex darker.....*discolor*, n. sp.
 Elytral intervals with two rows of more or less coarsely confluent large punctures, giving the intervals a rugulose appearance.....8
8. Mandibles not visible from above, covered by the large clypeus; color piceous, with base largely and an indefinite spot near apex reddish*prosopis*, n. sp.
 Mandibles more or less visible from above; color variable, piceous, elytra with basal and apical reddish-testaceous spot, or the spots may become larger and confluent, leaving only the suture narrowly and side margins darker.....*suffusa* Casey.
9. Reddish testaceous, head and thorax darker, elytral intervals on each side with one row of tubercles, leaving at middle a narrow longitudinal, nearly smooth space.....*sulcata* LeConte.

DESCRIPTIONS OF SPECIES.

Bitoma vittata, n. sp.

Elongate, thorax distinctly narrowing from apex to base, piceous, opaque, each elytron with a longitudinal reddish vitta not quite attaining the apex. Head granulate, finely and sparsely pubescent, ninth joint of antennæ not wider than the eighth. Thorax broader than long, distinctly narrowing to base, apical angles not prominent, side margins finely crenulate, disk with two costæ on each side, the inner not as distinct as the outer, surface granulate. Elytra distinctly broader than the thorax at base, with three discal and one submarginal costæ, which are sparsely pubescent with short pale hairs; intervals with two rows of tubercles, the two rows of tubercles separated by a nearly smooth, longitudinal median space. Metasternum not coarsely granulate, the granules slightly longitudinally confluent; abdomen feebly punctate and sparsely pubescent.

Length, 2.75 mm.

Brownsville, Tex., one specimen in the Hubbard & Schwarz collection, collected by Mr. E. A. Schwarz.

Type.—No. 10443, U. S. National Museum.

This species has the thorax more distinctly narrowing to base than any other species known to me, which character, together with the elytral sculpture and markings, makes it an easily recognizable species.

I have taken a specimen in Brownsville which is reddish testaceous, with suture and side margins slightly infuscate, but which does not differ otherwise; this is evidently not fully colored yet.

***Bitoma pinicola*, n. sp.**

Elongate, depressed, form of *quadriguttatus* Say, but slightly broader, more depressed, the markings at best feebly defined and slightly different in position. Head opaque, black, paler at apex, granulate and very sparsely pubescent. Thorax broader than long, sides slightly arcuate, margins feebly crenulate, disk on each side with two costæ, the outer distinct, the inner feeble and obliterated near apex; surface granulate, piceous and scarcely pubescent. Elytra scarcely wider than the thorax, disk with four slightly elevated costæ, intervals with two rows of coarse punctures, which are scarcely confluent; color piceous, with four not very well defined red markings on each elytron, of which a narrow oblique humeral and an apical rounded spot are more visible than the two others; one of them is situated near side margin between the humeral and subapical spot and the other slightly below the subapical, the latter at about apical third. Body beneath and legs piceous; metasternum longitudinally strigose.

Length, 3 mm.

Lakehurst, N. J., on pine.

This species resembles *quadriguttatus*, but is broader, more depressed, the elytral sculpture not as coarse as in that species; the position of the subapical spot is different, which is in *quadriguttatus* oblique and slightly behind middle, in *pinicola*, when present, apparently rounded and at apical third and the thoracic costæ, especially the inner, are never as distinct as in *quadriguttatus*. In the type the markings can be traced and are as above described; in a few others the markings are either absent or only the humeral and subapical can be feebly seen.

***Bitoma discolor*, n. sp.**

Elongate, depressed, opaque, pale rufotestaceous; head, thorax, four spots, and apex of elytra darker. Head finely granulate, sparsely pubescent; antennæ with ninth joint not wider than eighth. Thorax

nearly as long as broad, feebly narrowing to base, apical angles distinct, basal angles rectangular, base feebly lobed, side margins irregularly crenate, disk with four costæ as in *quadriguttatus*, surface granulate. Elytra slightly wider than the thorax at base, with the usual four costæ, which are very prominent and slightly crenate at their summit; intervals with two rows of well separated round perforate punctures, separated by a broad, nearly smooth, longitudinal median line; color rufotestaceous, with darker markings as follows: One at scutellum, one slightly below middle at suture, one on each side near side margin, between the scutellar and sutural spot and apex more or less piceous. Metasternum and abdomen obsoletely punctate and sparsely pubescent.

Length, 2.75-3 mm.

Biscayne Bay and Key West, Fla.; Cayamas, Cuba. For the Biscayne Bay specimens I am indebted to Mrs. A. T. Slosson; the Key West and Cayamas specimens were collected by Mr. E. A. Schwarz.

Type.—No. 10445, U. S. National Museum.

The apical dark elytral space is variable in extent and is connected in some specimens with the marginal spots. The elytral spots in some specimens are darker than in others. The coloration, as well as the sculpture, distinguishes this species readily from any of our species.

***Bitoma prosopis*, n. sp.**

Elongate, piceous, opaque, sparsely pubescent; elytra with four not clearly defined reddish spots, two occupying basal third, leaving suture and sides narrowly piceous and two near apex. Head nearly smooth, opaque, sparsely pubescent; antennal club two-jointed; clypeus covering the mouth parts. Thorax slightly broader than long, apex and base equal, feebly arcuate at sides, side margin finely crenulate, the inner of the two lateral costæ nearly obsolete, disk finely granulate and sparsely pubescent. Elytra very little wider than the thorax at base, with four elevated discal costæ, which on their summit are slightly crenulate and clubbed with short white hairs; intervals with rows of large coarse punctures, more or less transversely confluent, giving them a rugulose appearance. Body beneath ferruginous, opaque; metasternum and abdomen feebly punctate and sparsely pubescent.

Length, 2 mm.

Two specimens, one from New Braunfels, Tex., in Coll. Dietz, the other from San Diego, Tex., in the Hubbard and Schwarz collection, U. S. Nat. Museum; the latter was collected May 23 by Mr. E. A. Schwarz, whose manuscript name I have used.

Type.—No. 10444, U. S. National Museum.

This species can only be compared with the darker specimens of *suffusa* Casey, from which it principally differs in smaller size, coarser sculpture of the elytral intervals, and longer clypeus, which covers the mandibles completely, the latter always more or less visible in *suffusa*.

***Bitoma suffusa* Casey.**

Mr. Schwarz is of the opinion that this species is synonymous with *gracilis* Sharp. This view is very likely correct, but the description is not sufficient to identify the insect with certainty, and as some of the species are very close I retain for the present Casey's name for this species.

A few specimens before me, collected by Mr. Schwarz in Yuma, Ariz., are slightly larger, darker in color, and in some the sculpture of the intervals is coarser, but I am not able to find at present a good character to separate these from the lighter colored specimens.

***Phlæonemus catenulatus* Horn.**

P. adharens Sharp.

Mr. Schwarz suggested the above synonymy to me. The description and excellent figure of the Guatemalan insect agree so well in every respect with our species that there is no doubt of the correctness of this view. A few specimens occurred at Brownsville, Tex., with the typical form, with which they agree in every respect except that the elytral costæ are several times interrupted; these may be Reitter's *interruptus*, which is said to be 7 mm. long, while my largest specimen is 5 mm.

***Lithophorus succineus* Pasc.**

I bred a few specimens of this fine species from branches of *Acacia flexicaulis*, and also obtained some by beating. The genus *Lithophorus* is a member of the tribe Bothriderini and differs principally from the two genera in our fauna by the form of antennæ; the joints 7, 8, and 9 slightly increasing in width, 10th much larger than the 9th, 11th very small, hardly visible. The species is black, nearly of the form of *Bothrideres geminatus*, but larger and more convex; thorax uneven, with a depression at middle and tuberculate at sides, the third and fifth elytral intervals with interrupted costæ, each costa at middle with a transparent yellow spot, "like a jewel or piece of amber," as Dr. Sharp so aptly describes them; at sides and apex are a number of tubercles and granulations.

Lobogestoria gibbicollis Reitter.

Aditoma bifida Casey.

Looking over some Cuban coleoptera in the National Museum with Mr. Schwarz, I recognized in *Lobogestoria gibbicollis* what I had identified as *Aditoma bifida*. Mr. Schwarz kindly gave me a Cuban specimen for comparison with my insect, which is from Louisiana, but I was unable to find any character to separate the two. Reitter described his species as a lathridiid on account of the three-jointed tarsi, of which no mention was made by Major Casey in the description. Casey's specimen came from Florida.

A WONDERFUL NEW BEETLE OF THE GROUP COPRIS.

By EDWARD A. KLAGES.

Tetramereia, n. gen.

Form rounded; legs strong. Head clypeate; thorax wider than long, broadest before middle; elytra subtruncate; metasternum rhomboidal (as in *Phanæus* MacLeay), not projecting anteriorly (a character of *Oxysternon* Castelnau). Antennæ nine-jointed, the first joint of the club roundly infundibulate and receiving the others. Tarsi four-jointed, widely flattened, edged with moderately short, stiff hairs, and with the superior surface inclined toward the center of the body; the first joint as long as the rest of the foot, the second joint half as long as the first, the third joint scarcely longer than the fourth; the first three joints as wide as long and somewhat reniform; the claws and anterior tarsi wanting. Fore tibiæ with a movable, terminal spine and with the outer edge toothed; the hind tibiæ with a single terminal spine, the middle and hind tibiæ expanding to apex.

Type: The following species:

Tetramereia frederickii, n. sp.

Brown-black; head and thorax rather densely punctured, becoming rugose on front; clypeus emarginate, with two rounded teeth; thorax with median lateral impression, and with the basal portion feebly impressed on medial line; elytra rather deeply striate and finely punctured; front tibiæ four-dentate, the outer three teeth large.

Length, 15 mm.

Suapure, Caura Valley, Venezuela, July 5, 1899.

Type.—Collected by the author and forming part of his collection.

Named in memory of my brother, Frederick W. Klages,^a who died Mar. 28, 1886, at the age of 27 years.

The specimen above described is seemingly a small female. The head has the rudiments of a horn and the thorax has a transverse ridge near the front margin. Analogous processes are observable in small females of certain species of the genus *Phanæus*, to which this is very closely related.

DECEMBER 6, 1906.

The 209th regular meeting was held at the residence of Dr. C. W. Stiles, 1412 Hopkins street, N. W. President Banks occupied the chair and the following persons were present: Messrs. Banks, Barber, Burke, Busck, Caudell, Currie, Davis, Dyar, Fiske, Gill, Heidemann, Hopkins, Howard, Johnson, Knab, Marlatt, E. F. Phillips, Reeves, Sasscer, Stiles, Titus, and Webb, members, and Messrs. C. E. Burden, C. B. Dyar, Dudley Moulton, and Dr. Reid Hunt, visitors.

Officers for the ensuing year were elected as follows: President, A. D. Hopkins; First Vice-President, O. Heidemann; Second Vice-President, E. A. Schwarz; Recording Secretary, W. F. Fiske; Corresponding Secretary, J. G. Sanders; Treasurer, J. D. Patten; members of the Executive Committee, in addition to the officers, Harrison G. Dyar, L. O. Howard, and C. L. Marlatt. Dr. A. D. Hopkins was nominated to represent the Entomological Society of Washington as a vice-president of the Washington Academy of Sciences.

Mr. Webb exhibited a rare cerambycid beetle, *Brothylus conspersus* Lec., collected by Mr. H. E. Burke in the Yosemite National Park, Cal., the past season.

^a Fred. W. Klages was the first naturalist of the family and one of the pioneer entomologists of western Pennsylvania. He collected in the South and in Jamaica and rediscovered and made known the habitat of the hitherto exceedingly rare butterfly, *Papilio homerus* Fab. The late Dr. John Hamilton, in his "Catalogue of the Coleoptera of South-western Pennsylvania," gave his name as "William," an error until now uncorrected.

—Mr. Burke showed a rather rare tussock moth from the Yosemite National Park, Cal., *Notolophus oslari* Barnes. He stated that investigation proved to him that this species was responsible for the bare tops frequently seen in that portion of California in the California white fir (*Abies concolor*). From larvæ kept under observation were reared *Chalcis ovata* Say, *Tachina mella* Walk., and some braconids. A comparison of the egg-masses of this species with those of three other well-known tussock moths, namely, the white-marked tussock moth (*Hemerocampa leucostigma* S. & A.), the gipsy moth (*Porthetria dispar* L.), and the rusty tussock moth (*Notolophus antiqua* L.) is interesting; whereas the white-marked tussock moth surrounds its egg-mass with froth, and the gipsy moth's egg-mass is covered with hair, that of *Notolophus oslari* is surrounded with both froth and hair, while that of *Notolophus antiqua* is bare. Doctor Dyar stated that *Notolophus oslari* was described from Colorado and this California record of Mr. Burke was new; both the larva and the female were undescribed. Mr. Burke stated that the larvæ strip the fir trees from the top down for a distance of about 10 feet, thus destroying the seed crop. Doctor Howard suggested that *Pimpla inquisitor* Scop. be introduced into California from the Eastern United States to parasitize the *Notolophus*. Doctor Hopkins said that he found *Notolophus oslari* ovipositing, in October, 1905, on the trunks and branches of fir trees which had been defoliated by the larvæ, near Colorado Springs, Colo., and on visiting the same locality the following June he found that the eggs were hatching. Some of the egg masses were collected, which later yielded a large number of egg parasites. Doctor Howard remarked that these egg parasites found by Doctor Hopkins might prove useful for introduction into the East to combat the white-marked tussock moth, the gipsy moth, and the brown-tail moth (*Euproctis chrysorrhæa* L.).

Mr. Schwarz pointed out that this California record for a Colorado species was an illustration of the fact that the faunas of the eastern slope of the Sierra Nevada Mountains and the western slope of the Rocky Mountains are closely related. The real Pacific fauna is that of the Coast Range alone. Many persons,

Mr. Schwarz said, erroneously considered the fauna of the Rocky Mountains as radically different from that of the Sierra Nevada. The faunas of the Wasatch Mountains of Utah—a spur of the Rocky Mountain system—and that of the Sierra Nevada in the vicinity of Lake Tahoe, California, are remarkably alike. There is in the U. S. National Museum a list of Coleoptera collected by the late H. G. Hubbard on the Wasatch Mountains, Utah, and another list of Coleoptera collected by Mr. Hubbard in the same year at Lake Tahoe. A comparison of these two lists would illustrate the affinities of the two faunas. Doctor Hopkins then discussed the relation of bark-beetles to the faunal regions of the eastern and western sections of the Rocky Mountain and Pacific Coast areas and the evident value of these insects in defining local divisions and sections of these regions as distinguished from those defined by their host plants. He contended that in determining faunal regions one should study groups of insects rather than single species. Mr. Schwarz said that it was necessary to have experience to know what group to single out for study as aiding in the determination of zoogeographical regions. As an instance he cited the carabid genus *Nebria* as admirably adapted for illustrating geographical distribution, not only as between the Boreal and Transition zones, but also as between the Rocky Mountain system and the Sierra Nevada.

—Mr. Busck showed some colored illustrations of Walker's types of Microlepidoptera prepared for the U. S. National Museum by an artist in the British Museum.

—Doctor Howard mentioned a rather amusing incident in connection with Mr. George Compere's efforts to introduce parasites of the codling moth (*Carpocapsa pomonella* L.) into California from Europe. When the parasites arrived at their destination no codling moth larvæ could be found to which to transfer them, and larvæ had to be shipped in cold storage from New Zealand to California to meet the emergency.

—Mr. Knab stated that he had come to the conclusion that the character of toothed or untoothed claws in adult mosquitoes would not define generic limits, for he had discovered that this character is subject to variation, sometimes even within the same species.

—The first paper of the evening, an abstract of which follows, was by Doctor Howard:

POLYEMBRYONY AND THE FIXATION OF SEX.

By L. O. HOWARD.

(Author's Abstract.)

The speaker described his early observations on strange methods of pupation among the Chalcididæ (American Naturalist, 1882; Insect Life, Vol. IV, 1891; and Proceedings of the U. S. National Museum, 1892), indicating the existence of certain unexplained phenomena in the development of certain hymenopterous parasites of the family Chalcididæ, which have subsequently been cleared up by the discovery of Marchal of the existence of the extraordinary process known as polyembryony, by virtue of which from a single egg there may come very many adult individuals. He reviewed the work of Bugnion on the anatomy and habits of *Encyrtus fuscicollis* (1891), a note by Giard (1898), and several papers by Paul Marchal culminating in his startling work entitled *Researches upon the Biology and the Development of Parasitic Hymenoptera—Specific Polyembryony or Germinogony* (1904). He further reviewed a paper by F. Silvestri entitled *Contributions to the Biological Knowledge of Parasitic Hymenoptera: (1) Biology of Litomastix truncatellus* (1906); and the admirable summary of Marchal's work by Bugnion, also published in 1906. The paper in full up to this point is published in *Science*.^a

The speaker then called especial attention to the extreme interest attaching to further observations of this wonderful life process, and dwelled upon the abundance of material for study existing on every hand, the requirements for its investigation, now that the initial discoveries have been made, being simply good laboratory facilities and a skilled technique together with trained powers of observation. These are to be found with many institutions and many individuals in this country, and there is every hope that before long the darkness that has existed in our knowledge of the intimate early life history of the parasitic Hymenoptera will be changed into the bright light of accurate knowledge.

The speaker exhibited a large series of species of the encyrtid genera *Copidosoma*, *Litomastix*, and *Ageniaspis*, together

^a *Science*, n. s., Vol. XXIV, No. 625, December 21, 1906, pp. 810-818.

with a series of the distorted and cocoon-filled larvæ of their hosts, showing that these insects had been bred from a large series of lepidopterous larvæ of the tineine and tortricine series, together with certain noctuids and pyralids. He also exhibited one interesting specimen of a noctuid pupa—that of *Papaipema nitela*—which indicated that the larva, parasitized by a multitude of *Copidosoma* larvæ, had succeeded in pupating before its destruction, the parasites having apparently been unable to issue by perforating the tough integument but having come out through an accidental break in the skin.

In discussing the possibilities of further discoveries, and as indicating the most promising directions toward which investigations may be made, he stated that it is altogether likely that all species of the genera *Copidosoma*, *Litomastix*, and *Ageniapsis* will be found to have this method of development. *Copidosoma*, as restricted, is well-known to be parasitic in Europe and North America upon the larvæ of Microlepidoptera; *Litomastix* is known to be parasitic upon the larvæ of Microlepidoptera, certain noctuid and geometrid larvæ, and also upon cossids. *Litomastix truncatellus*, for example, is known to be parasitic in the large wood-boring larva of *Zeuzera æsculi*. What an extraordinary opportunity for polyembryony exists here, when we consider the immense numbers of parasites which a full-grown larva of *Zeuzera* could harbor! The genus *Bothriothorax*, the species of which infest large dipterous larvæ and puparia—particularly the Syrphidæ and the Anthomyiidæ—is a probable form. *Homalotylus*, which produces the same inflated aspect with the larvæ of certain coccinellids and chrysomelids, is another one; *Dinocarsis*, whose only known host is *Thyridopteryx*, is still another; while all of the lepidopterous parasites belonging to the old genus *Encyrtus* as listed by Dalla Torre are hopeful subjects for future investigation. Those forms infesting the smaller Coccidæ and especially the Diaspinæ, may be shown to have the normal development, but genera like *Rhopus*, certain species of *Microterys*, *Trichomasthus*, *Aphycus*, *Blastothrix*, and *Leptomastix*, which infest the larger scale insects and issue in considerable numbers from a single individual, should be investigated, as well as those parasites of the larger Coccidæ belonging to the genus *Encyrtus* as listed by Dalla Torre.

In fact, the polyembryonic development is strongly to be suspected in all cases where a minute hymenopterous parasite infests in large numbers a host of large size, as occurs in many groups of Chalcididæ and Proctotrypidæ as well as in some Braconidæ. Even in the familiar instance of *Pteromalus puparum*, the common parasite of *Pontia rapæ*, and others of

the very numerous pteromalid parasites of larger Lepidoptera, also with many of the forms of the family Eulophidæ as defined by Ashmead, and especially perhaps in the subfamilies Entedoninæ and Tetrastichinæ, and some at least of the Elachistinæ, we may hope to find this mode of development. We have only to remember the manner in which a lepidopterous chrysalis is sometimes packed with parasites of the genus *Cirrospilus*, or a large ichneumonid larva with *Dibrachys*, to see the force of this suggestion.

Apanteles among the Braconidæ also, naturally occurs to one, and the great number of larvæ issuing from a large sphingid larva is readily explicable by polyembryony, and this offers an easy and important field of investigation. For many years, the speaker said, he had had parasitized sphingid larvæ in different stages upon his desk awaiting the opportunity for dissection, but the chance had never come.

With the proctotrypids, Marchal has already shown us what occurs with *Polygnotus* and also what is to be expected with other forms of the subfamily *Platygasterinæ* (and here the speaker referred to a published announcement in the Bulletin of the Entomological Society of France for October, 1906, of the publication of Marchal's paper upon this group); and other subfamilies will bear investigation.

That polyembryony is a highly specialized function, and with insects one of the concomitants of parasitism, seems likely. It is therefore not to be expected in groups in which the parasitic mode of life is not old and firmly established for a very long period of time. With the parasitic Diptera, therefore, where from the non-specific character of the host relation it is to be assumed that the parasitic mode of life is of comparatively recent acquirement, polyembryony is not to be expected to exist. The large number of *Tachina* eggs with which a lepidopterous larva is frequently plastered is an indication of this.

In the discussion of the paper Mr. Reeves stated that he had found larvæ of the Hessian fly filled with the parasitic larvæ and pupæ of *Polygnotus*, upon which the transparent skin of the host larva had shrunk so as to lose its own form and reveal nothing but the contained mass of parasites. The largest number of parasites found in a single host larva was 41, the usual number ranging from 6 to 12. Doctor Stiles remarked that the figures of Marchal were very suggestive of

those illustrating the development of the malaria parasite and that this polyembryony suggested the alternation of sexual and asexual generations found in Protozoa and the trematodes. As the rate of increase by the asexual mode is much more rapid than that by the sexual mode it is fortunate for humanity that in the case of the malaria parasite the period during which reproduction can continue by the asexual mode alone is limited. Certain phenomena resembling polyembryony, occurring in other forms of animal life, were pointed out by various members present, and Doctor Phillips spoke of the artificial production of half and quarter embryos by chemical and mechanical means and also referred to the work of Doctor Conkling on ascidians, which seems to contradict the Mosaic theory of development.

—Mr. Banks presented the following paper:

THE PSYCHODIDÆ OF THE VICINITY OF WASHINGTON.

By NATHAN BANKS.

For several years I have taken some interest in collecting the Psychodidæ wherever I have resided, and have now a dozen species from the vicinity of Washington, four of which are new. These tiny, delicate flies are not easily preserved for the cabinet; it is necessary that they be mounted soon after capture, and that no other insects be in the vial with them; so that unless one goes especially prepared to catch them, his captures will not be worth much.

I have not had the facilities to attend to the rearing of any of the species, but offer notes on the habits and habitats of some of the forms. I am inclined to think that most of our species do not live in water, but only in moist places.

***Psychoda alternata* Say.**

Our most common species, taken in June, July, August, and November. It is often found resting on out-buildings, and doubtless breeds in muddy spots adjoining them.

***Psychoda cinerea* Banks.**

Occurs on manure in the fields and woods, often far from

water, and evidently breeds in the manure. Falls Church, Va.; High Island, Maryland; April to November.

***Psychoda minuta* Banks.**

Taken at Falls Church, Va., in April, May, and October. It is sometimes seen flying around the lamp on warm summer nights.

***Psychoda nigra* Banks.**

Not uncommon near streams, resting on rocks, under bridges, and under leaves of plants overhanging the water. Falls Church and Glencarlyn, Va., in May, July, and August.

***Psychoda superba* Banks.**

On the trunks of large trees in moist and shady places near streams; Washington, D. C., and Falls Church, Va., June and July.

***Psychoda nitida* Banks.**

The only specimens seen were taken on the trunks of large trees on Fourteenth Street, Washington, D. C., in August.

***Psychoda signata* Banks.**

Also taken on trunks of trees, Washington, D. C., in July.

***Psychoda opposita* Banks.**

Taken in June and July in Washington, D. C., on trunks of trees.

***Psychoda quadripunctata*, n. sp.**

Head black, some whitish-gray hair above; antennæ dark brown, tapering; thorax black, densely clothed with whitish-gray hair above, and jet-black hair behind near the abdomen; the latter black, with mostly black hair, a streak of whitish hair each side toward tip; legs blackish, the tarsal articles white at the tips. Wings with grayish-white hair on basal part along the second vein, and near the anal margin; on the basal part are four tufts of erect jet-black hair, one near costal margin near base, one on anal margin at end of whitish hairs, and two on the discal part of wing just before the middle; costal fringe long, jet-black, interrupted just beyond the middle and just before the tip by patches of snow-white hair, two similar patches in

posterior fringe, one near tip and one at middle, rest of fringe dark brown and extremely long; on the margin the veins end in minute black spots.

Expanse, 2.8 mm.

One specimen from Falls Church, Va., 15 May. A very handsome species.

***Psychoda interrupta*, n. sp.**

Head and thorax densely clothed with whitish hair above, some gray on the middle of the thorax; antennæ with gray hairs, tapering; abdomen black, some white hair each side at tip; legs pale, marked toward the tips with blackish, the hind tibia blackish at tip, the basal and apical tarsal joints mostly black. Wings gray on basal part, with few hairs, more densely haired on apical part and more or less dark brownish, in some specimens a faint appearance of three dark bands, one apical, one at middle, and one near base; costal fringe gray, white near tip; apical fringe snow-white, at outer anal angle a broad patch of black fringe, basal of it is white, and then brownish. In the apical part of the costa in well-marked specimens, are three small white spots, slightly indenting the wings from the costal margin.

Expanse, 2.4 mm.

Several specimens from Plummers Island, Maryland, 24 July, 28 August, attracted to the light.

***Psychoda basalis*, n. sp.**

Head and thorax with brownish hair, a prominent tuft of white hair on face; antennæ black; thorax rather yellowish brown; abdomen black, with black hair; legs black, with some scattered white hairs, rather longer than usual. Basal half of wing jet black, made so by dense hairs from the veins, a tuft of gray at extreme base; beyond the middle of wing the hair is grayish and sparse; basal, costal, and posterior fringes black, apical fringes less dense and grayish, although the extreme tip is jet black. Allied to *P. bicolor* Bks., but distinct by dark gray hair on thorax (white in *P. bicolor*), and by darker legs, etc.

Expanse, 3.1 mm.

Several specimens from Falls Church, Va., May 7 to 15.

***Psychoda apicalis*, n. sp.**

Head and thorax with grayish-white hair above, brownish behind on the thorax; antennæ and legs jet-black; abdomen densely gray-haired. Wings rather broad, black, some grayish-white hair on basal

part; near the middle are two darker discal patches, rather indistinct; costal fringe jet-black, anal fringe rather more brownish, latter quite long, at apex of wing is a broad patch of snow-white fringe. Hind tibiae with a fringe of long black hairs behind. Markings similar to *P. marginalis* Banks, but it is a blacker insect, with black tarsi (honey-yellow in *P. marginalis*).

Expanse, 3.5 mm.

One specimen from Falls Church, Va., 17 July.

Mr. Knab spoke of the finding, by Mr. J. B. Van Duzee, of a psychodid larva in water between the leaves of a Bromelia in Florida. The adult, on examination, seemed to be a new species. Another psychodid larva he himself found to be very abundant in moisture at the margin of a sewer outlet in Mexico. Mr. Barber referred to his former note before the Society (see p. 102) on a blood-sucking psychodid, *Flebotomus* sp., found in Guatemala, and stated that a species of *Flebotomus*, had lately been discovered by him at Plummer's Island, Maryland, and that this species had the same annoying habit.

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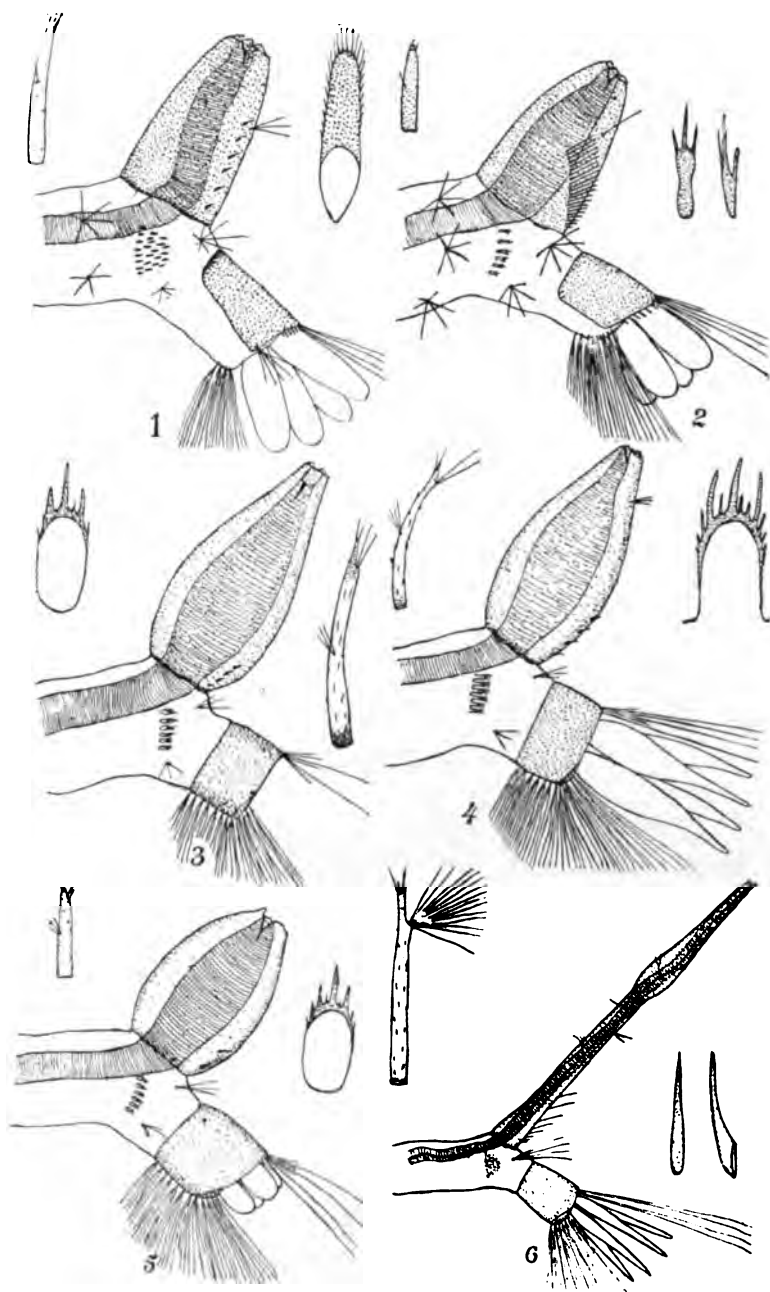
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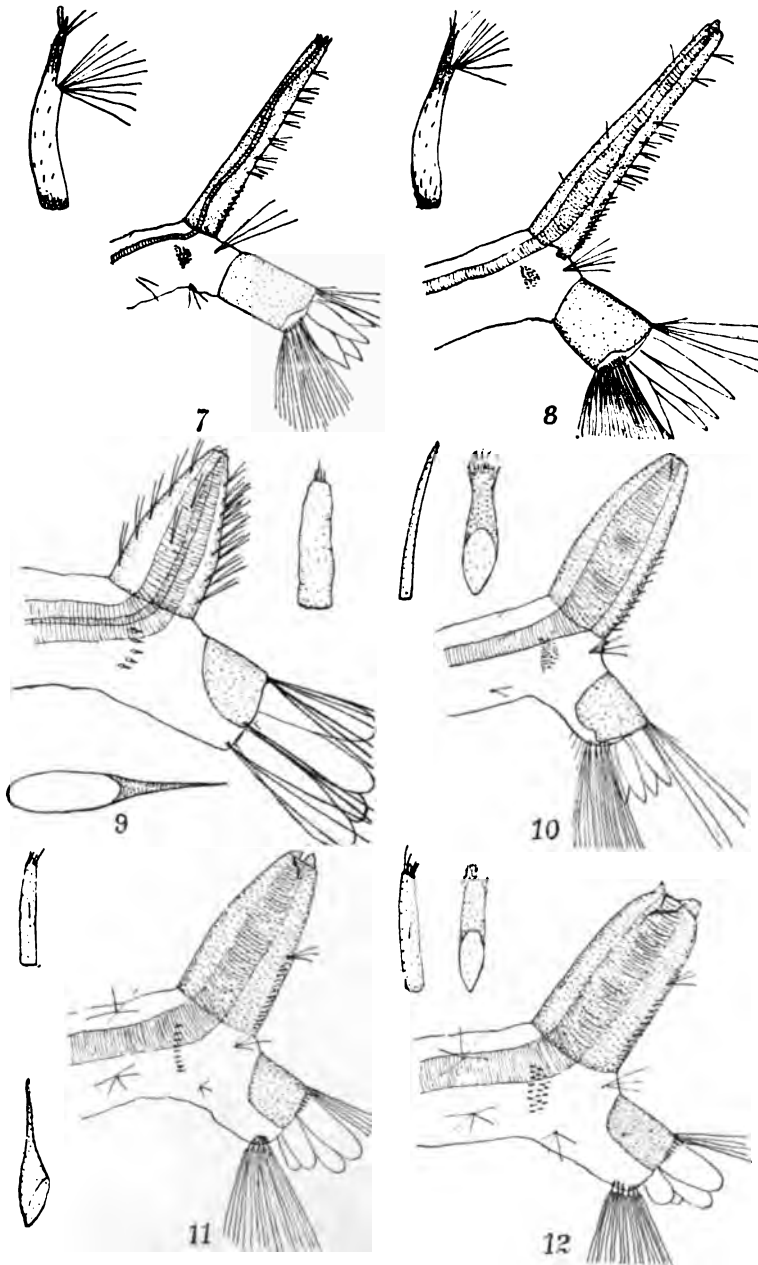
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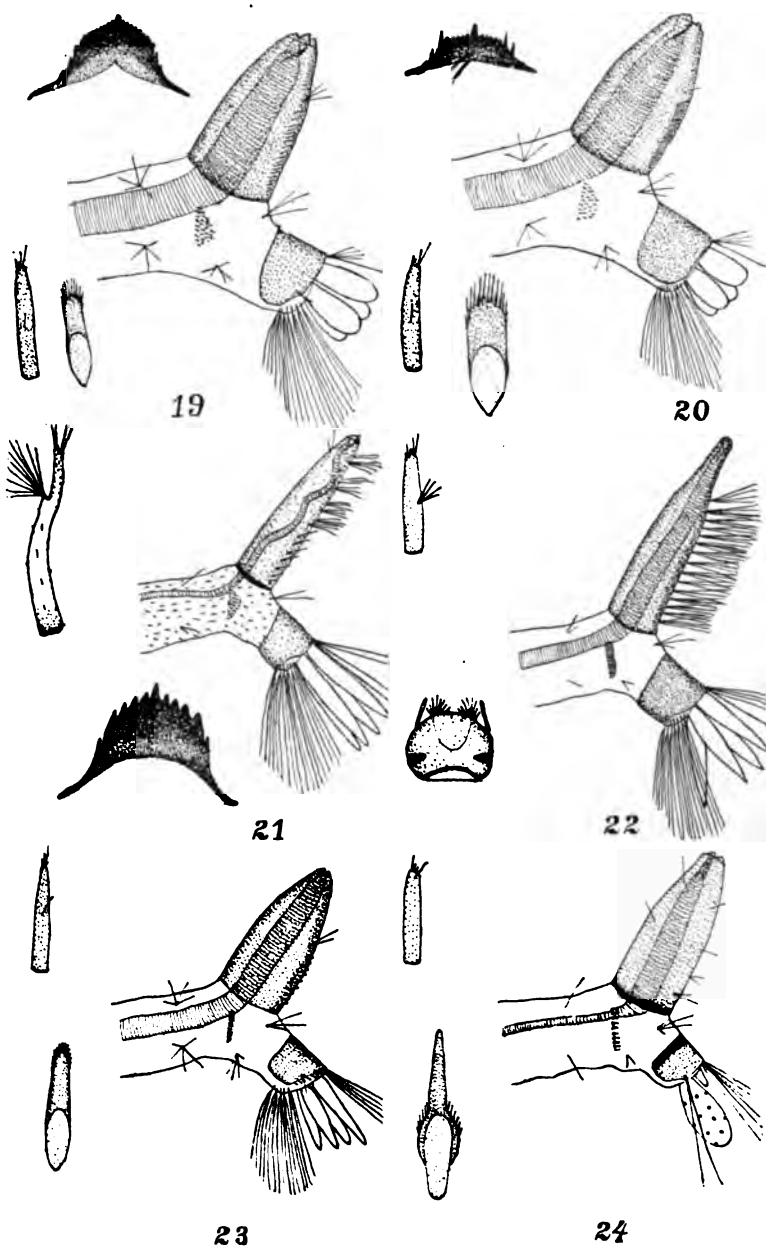
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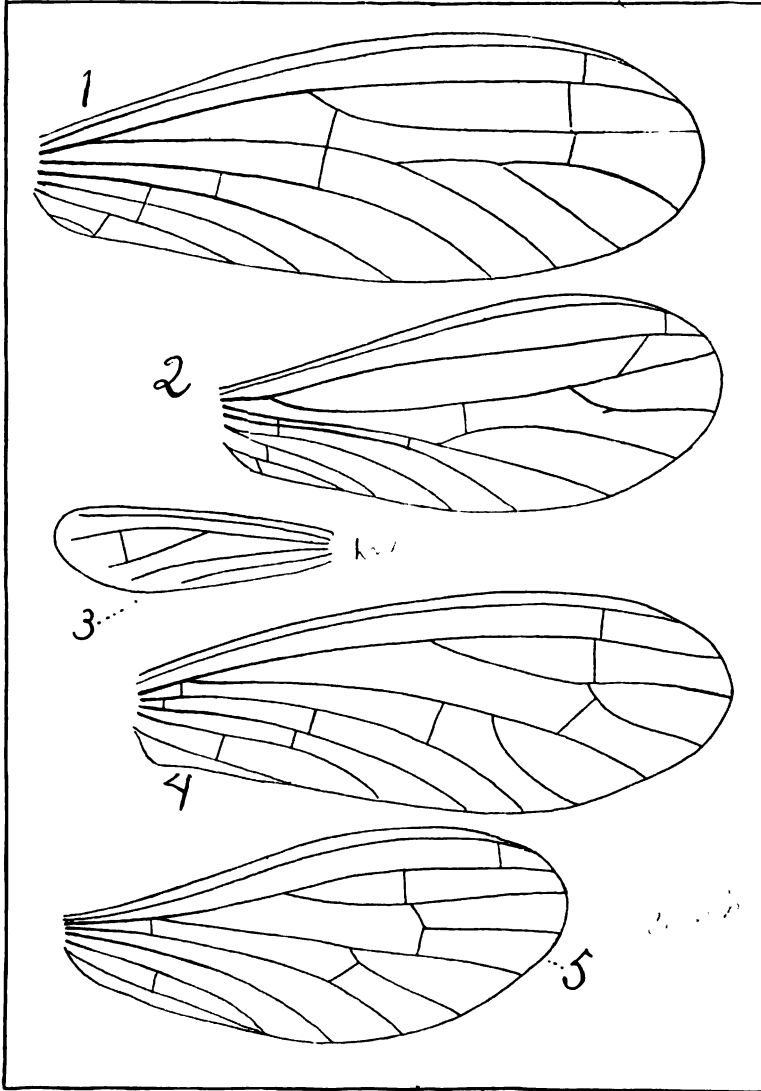
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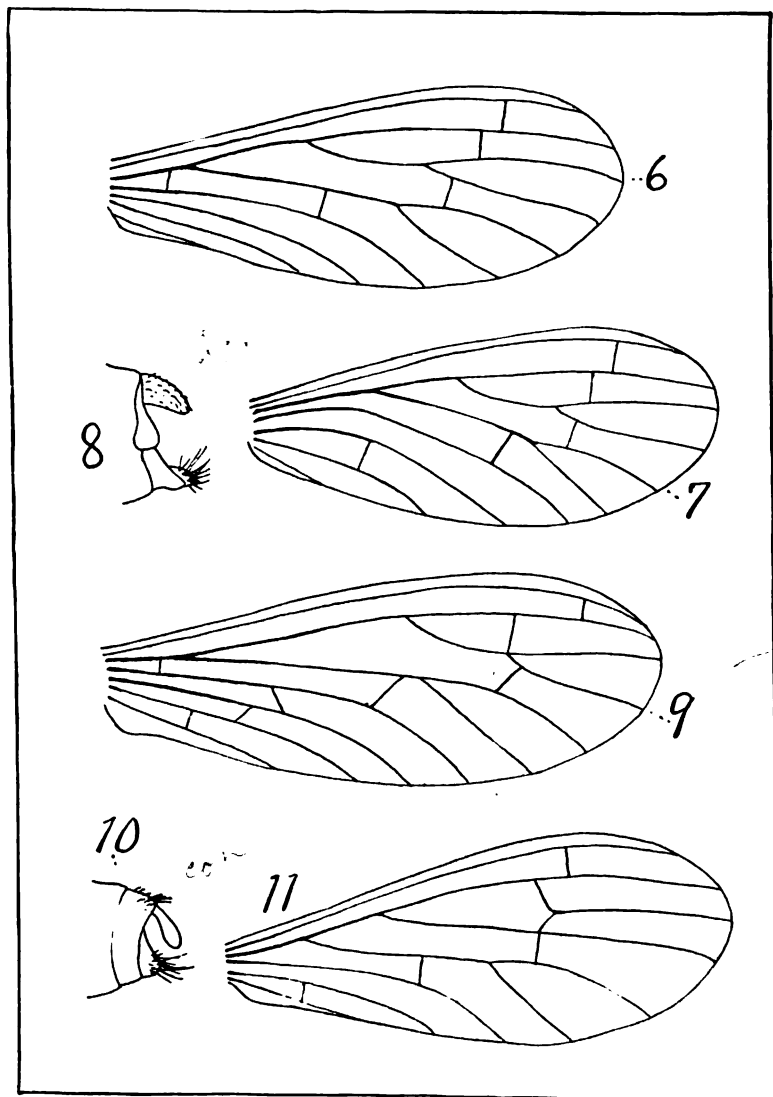
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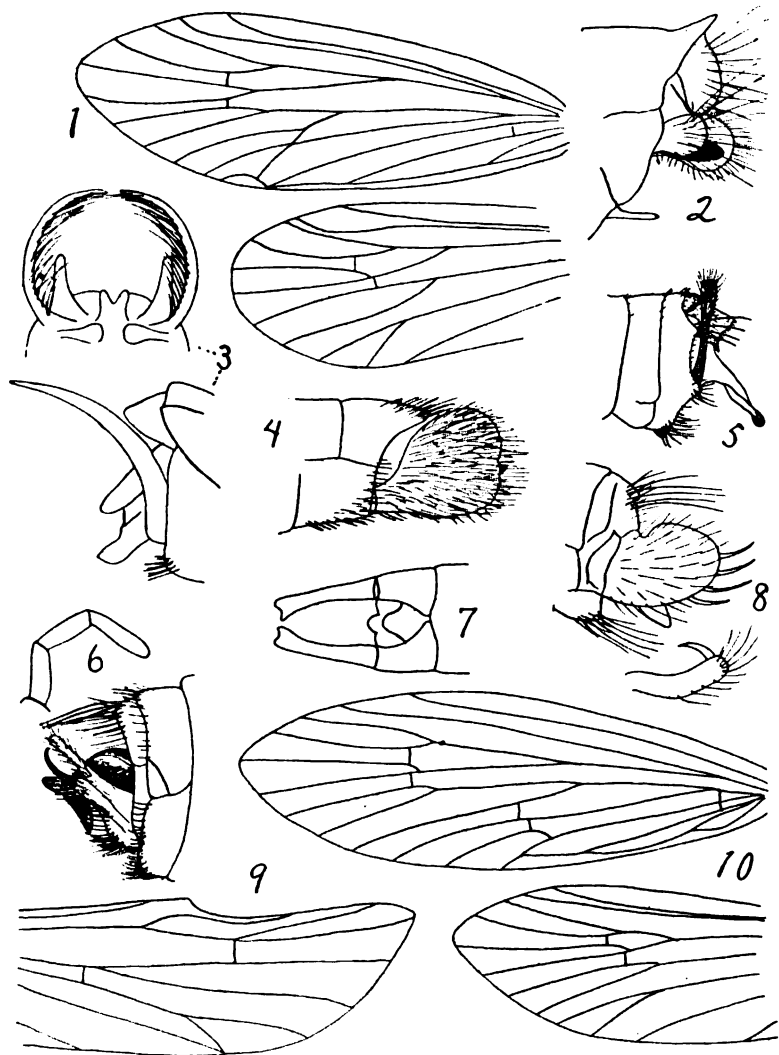
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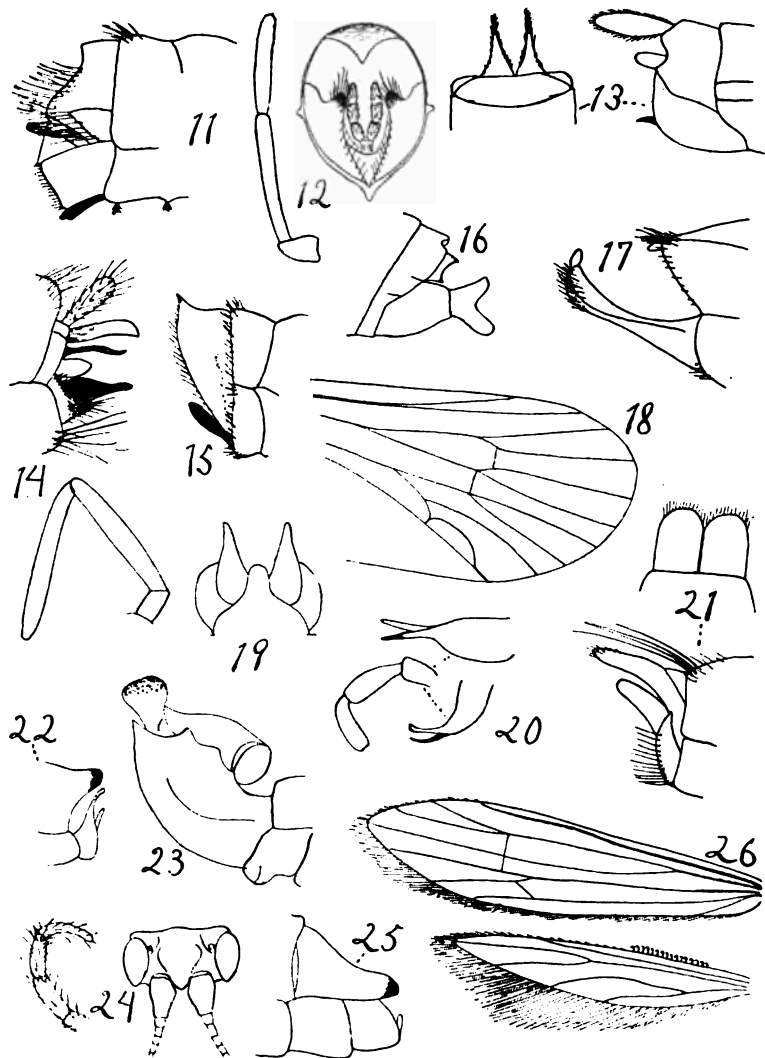
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